The Builder.

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ILLUSTRATIONS.

The General Custom-house, Pest.—Herr Nikolaus Ybl, Architect 1296, 1297
The Houses of Parliament, Vienna.—Herr Theophil von Hansen, Architect 1296, 1297

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What we have been Doing in 1877.

WHEN, at the commencement of the present year, we were honoured by a visionary interview with the presiding genius of architecture *in propriâ persond*,* we remember that our visitor ushered in the new year as a helper who would not fail us in the path of progress, if we on our part were not slack to make use of the opportunities he gave us. And now we print "1877" on the head of our page for the last time, and turn round rather anxiously to look back over what has been accomplished in the last twelve months by ourselves and those on whose account we are concerned: to consider whether "something attempted, something done," can be recorded as matter for congratulation.

Putting ourselves aside for the moment, and looking at the events of the past year generally, it is not easy to say that anything has really been fully accomplished which is of great importance. Yet one may call 1877 not an uneventful year in the architectural world, in regard to the number of subjects of real importance, and sometimes novelty, which have been at all events started, discussed, and in some cases carried to a certain extent on their way. Indeed, turning over the weekly records, and putting together the various matters chronicled, we cannot but be struck with their variety, and the large nature of the interests involved in many cases.

Taking architecture pure and simple, however, this has not been a great building year. It has witnessed the completion of the second largest building in progress in England, the Manchester Town Hall, concerning which sufficient has been written by us at various periods in the course of its erection, and which perhaps may be said to have been completed in its architectural essentials even before the commencement of this year. And in regard to the largest English building now in hand, one of the largest ever carried out in modern times, we may note that during the last few months the eastern block of the Law Courts has advanced to that stage at which its external architecture at least may be fairly judged of; perhaps as fairly as when it is finished, for unless London should ever sacrifice untold property to make a grand *place* round the building, it will always be, from its circumstances, one to be regarded in detail rather than as a whole. And partly for this reason we prefer to pass lightly over the Law Courts in its present stage, considering that if there is no promise of the building ever becoming such a grand and expressive architectural whole as the Houses of Parliament present, the very nature of its position would render the appreciation of such a building *en masse* impossible, and that the time for estimating the real merit and success of the building will be when the western portion is up and the interior complete, and we can judge not merely of its internal effect as decorative architecture, but of the manner in which the architectural treatment is subservient to its practical requirements. We wish to express no doubt of a favourable result in this respect: only to remind those concerned that the want of scientific planning and arrangement in our courts is a crying one, and that the provision of ever so much beauty of Gothic detail will not reconcile the legal mind, either professional or lay, to a building that is not a remarkable advance in convenience and scientific planning upon our existing temples of law and equity.

The completion of the new nave of Bristol Cathedral by the same architect who is carrying out the Law Courts is an interesting piece of work, upon which we may give more particulars when we publish our promised illustration of it: interesting in this particular way, that it is an almost solitary instance, in England, of the completion by a modern architect of a cathedral left unfinished by the original builders. It thus tands in quite a different category from "restoration" (about which so much has lately been said), and may be regarded, from the architect's point of view, as a legitimate effort to complete artistically an unfinished design, quite apart from any difference of opinion as to its ritual significance.

Among the works in restoration, great attention has been attracted during the year to what has been done at Tewkesbury, where a distinct stage in the work may be said to have been reached in the completion of the eastern portion of the building. Still greater interest has attached to the similar work of St. Alban's, which, however, has reached no special phase in its progress this year; the intended operation of forcibly adjusting the walls to the perpendicular, one of the most interesting and critical operations that could be performed on a great building (and, as we need not remind our readers, one very rarely undertaken) not having yet been carried out.

Architecture of a more modern and practical character has not been unrepresented, and two buildings may be mentioned as having occasioned more talk than most others, though for very opposite reasons: the Grosvenor Gallery, because though open to criticism, it is on the whole a success even architecturally; the abortive attempt at an opera-house on the Embankment, because it is a failure, and we fear deservedly a failure, carrying its lesson with it in more ways than one: but on this also we have fully commented.* In the meantime, street architecture in its more practical but certainly not less important phases has not been without its successes, as (in regard to London more particularly) our illustrations of the past year will bear testimony; East London is receiving its quota of improvement and ornament in this respect, in some cases in an exceptionally satisfactory manner, in illustration of which we need only refer to the view of the premises in Aldersgate by Mr. Garling (p. 61, *ante*), and to others that are very good if not equal to these; Bishopsgate also has its new bank at the hands of Mr. Chatfeild Clarke, and the classic alley of Walbrook its new club by Mr. Grayson; and, on the whole, we have reason to be satisfied with a good deal of the quality of what has been done in new street architecture; and may observe while on the subject that this matter of street and city architecture, "business architecture," received special comment and illustration at one of the meetings of the last session of the Institute of Architects. Other buildings of a larger class for practical purposes have not been wanting, and have received due place in our illustration pages.

But the largest of these are trivial in comparison with the building scheme which is hanging over our heads, for execution in one way or another, for completing the concentration of the Government offices. This scheme, the main feature of which is, in the Governmental mind, the acquirement of the land immediately north of Great George-street, has attracted a good deal of public interest and public apprehension, on account of the private interests involved, and which must be ruthlessly crushed in carrying out the pet official plan. We devoted considerable space (pp. 852–58, *ante*) to criticising the official scheme, so far as it is yet open to public criticism, and setting forth in words and in a plan a method by which a more grandiose and effective arrangement could be realised, with nearly the same concentration, and without interfering with Great George-street. Since then we have learned that the obliteration of the houses on the Great George-street site is determined on, though, of course, their destruction will not be immediate. In the clean sweep thus threatened will be included one or two of the most artistically and historically interesting of the smaller private houses of old London, a matter of unavailing regret to their present owners. Our objection, however, was not so much to rebuilding the street frontage as to removing everything wholesale, and changing the uses of this particular street by supplanting its offices and chambers, now used by persons whose connexion with Parliamentary business renders it necessary for them to live near the House, with public buildings, and we pointed out

* See *Builder* for January 6th, 1877.

* See especially, *Builder* for October 6th of this year.

the difficulty that might arise from this. As to the street-frontage itself, we hold that it is deficient in dignity and stateliness for a street which forms the approach to the Houses of Parliament from Buckingham Palace, and that in view of the changing nature of the Westminster district now, the southern side will be very probably rebuilt, along with changes in the land in the rear of it, before any great length of time. It is certain that there would in such a case be opportunity for a grand *coup d'œil* in a new street in that position, taken in connexion with Birdcage-walk; and if it is a settled thing that there the remainder of the Government offices are to be, we hope that, at all events, the full architectural advantages of the site will be secured, as some compensation for what will be destroyed. But we would still urge, before it is in reality too late, consideration of the plan proposed in our pages as above referred to, especially in regard to its practical advantage of preserving the business offices in the neighbourhood of "the House" (which in some way or other must necessarily be provided for), and its opportunity for a splendid river front, which would turn to the highest account architecturally the opportunities afforded by the making of the Thames Embankment.

The whole subject of street improvements in London has been engrossing considerable attention during the past year, but with no very satisfactory or definite result so far; the discussions and contentions in regard to the projects of the Metropolitan Board of Works having served rather to show the need of a more despotic and entirely disinterested directing mind in these matters, than to give definite assurance of a speedy and satisfactory settlement of the improvements most urgently needed. We say advisedly a more despotic authority, believing, as we have often suggested before,* that matters of this kind would be managed much better here if there were a permanent Minister of Public Works, chosen for his administrative capacity and knowledge of the subject, and who, while more directly responsible to public opinion than any "Board" can be made to be, would have more power to carry out a scheme on a definite and systematic plan. In reference to the squabble, as it may not unjustly be termed, between the Board of Works and Lord Salisbury's agent in regard to the property adjoining the proposed line of street north from Charing Cross, one could not but feel that it was melancholy to see a scheme so important and so urgent, so plainly for the good and convenience of the public at large, made the ground for a mere contention for "compensation," and although the Board, of course, may say that they are only husbanding the ratepayers' money, we cannot in all these cases afford to wait for the cheapest possible way of securing what is greatly wanted, or to leave it to a body who seem possessed with such a *penchant* for financing to decide whether the best line of street is or is not to be abandoned for the glory of realising something good in the way of return for outlay. Under a more personal and despotic direction (always supposing the command to be vested in a thoroughly fit person) our main route north and south, for which we have been long waiting, would be made by now. As it is, we have only to look back on much talk, some consequent ill-feeling and bickering, and more uncertainty and delay. While on the subject of improvements in routes, however, we may congratulate ourselves that the way has been definitely cleared during the past year for one scheme which will have a very important bearing on the convenience of locomotion in London; we allude, of course, to the completion of the inner circle of the Metropolitan Railway. The practical value of the railway to the public will be just about doubled by this operation, even without the accelerated service which is promised, since the break at the Mansion-house renders the railway nugatory from many points. The increased facility of communication between east and west London, already commenced by the extension of the northern limb of the railway to Aldgate, has a moral as well as a commercial importance; for those who know anything practically of the work of social reform in East London know that nothing is more looked to by those who are in earnest about this than the breaking down of the line of demarcation between east and west, so as to let the one half of London know how the other half lives. Already this is being done in regard to some districts in East London to an extent which would be impossible but for the Aldgate Railway extension.

There have been few years in which public attention has been more directed to the subject of water supply than it has been in the latter part of the present year, in consequence of the promulgation of two important schemes for the supply of two great towns; the double-supply scheme for London, and the Thirlmere scheme for Manchester. Contrary to what is usual, the general public, and the daily papers which more or less represent them, have given manifestation to a popular interest, and even excitement, in regard to these subjects, which are more commonly left to be discussed by engineers and their immediate employers. The water-supply of London constitutes, in fact, a problem coming so near to the personal wants and experiences of its vast mass of inhabitants, and the dissatisfaction felt not only with the quality of water found for them by the companies, but with the *modus operandi* of these bodies in many ways, is so decided, that we cannot wonder that any scheme offering a definite amelioration of the water and a "good deliverance" from the hands of the companies should have excited general interest, which was probably more directly appealed to from the fact that the scheme was propounded and explained on so public an occasion as the meeting of the British Association. To our opinion on Messrs. Bramwell and Easton's scheme, already sufficiently expressed, we see every reason to adhere, viz., that it is in reality a half measure, the success of which, as far as it goes even, is hardly as yet shown to be certain, and that it is at the same time far too costly for a half measure: while its machinery will greatly add to the complication, already great, of the enormous system of supply pipes in London. We have already, since our opinion was first expressed, seen numerous indications that the newspaper enthusiasm for this scheme is abating under second thoughts or better information, and do not expect to see it carried out, though we need hardly say we are among the most urgent in pressing the necessity for a speedy and thorough settlement of the difficulty, before our sanitary sins be visited upon us by some widespread epidemic. It is because we feel the importance of this subject that we have not joined the popular cry against the scheme for supplying Manchester from Thirlmere, though earnestly wishing that a supply may be found elsewhere sufficiently pure and copious to justify letting the Lake district alone. The subject must be debated on practical grounds, and not on the basis of the sentimental lamentations of the Thirlmere Defence Association, who from their tone appear to be (as in so many similar cases) people who have no wish to hear the truth, but only to have their own way, and who are following the common course in such cases of denouncing all who do not accept their views as either unprincipled persons or blockheads.

The London gas supply is a subject of more or less popular interest of the same class, and which has had our special attention during the past year (p. 799, *ante*), but this is a much less pressing matter than water, and on a different footing, since for interiors at least other methods of lighting are possible, and a large proportion of the wealthier inhabitants of London are already taking the remedy into their own hands and dispensing with gas: though this does not affect the serious question of the deficient illumination of many of our streets. But another matter affecting the public health and convenience of London, the behaviour of the river on which the city stands, is a serious business, and nothing definite has been done to meet it yet. In the course of various comments on the subject at more or less length during the year, we have succeeded, we believe, in disposing of the popular but really absurd notion that the northern embankment has anything to do with the flooding of the southern bank; but that the absence of the "throttle-valve" of the old bridges has something to do with the difficulty is very probable. The embanking of the southern bank seems really the only satisfactory way of routing the enemy; and here again we have had the spectacle of delay in taking any course of action while those who imagined that they had opposite interests were disputing whose business it was to pay for it. So nothing has been done, or even determined upon. Perhaps if the members of the Board of Works were compelled themselves to dwell in and meet at Lambeth for a year, there might be something accomplished. It is easy for those who are safe out of the inundations to talk of the folly of being precipitate. Whilst they debate and procrastinate, large districts are living in continual anxiety and even peril. The other piece of recussancy of Father Thames, to the approach of which we have pointed from the first, has been brought into special prominence by Captain Calver's report, to which we gave full consideration last week. Thames is getting insubordinate: he *will* invade our homes, he will *not* remove our sewage. The past year has at least taught us that we have something to learn of his ways yet, old as the connexion is: let us hope the experience will be turned to account in the ensuing year.

Upon the considerations which bear directly upon the health and comfort of actual dwellings in towns there has not been much new light thrown during the past year, and less opportunity than usual for the *Builder* to treat afresh a subject we are justified in calling peculiarly its own. In our articles on "Central London" and the "Health and Growth of London" (pp. 366, 467), we endeavoured to summarise in a practical form some of the general conditions required to meet the wants of middle-class householders; and we may note in this connexion two communications in regard to the dwellings of the poorer classes, one having reference to the "cottage homes of England," and one describing the homes for workmen on the Continent in connexion with Government works at Stuttgart (with an illustration); the two subjects being rather significant in bringing out the contrast between the essentially individual and independent life of the English homestead, and the "patriarchal" system in operation in the Stuttgart homes,—a system by which the tenants have great advantages of comfort and economy at the expense of losing their independence and being "done for" like a set of charity children, or a superior order of paupers, a theory happily quite at variance with that which is becoming more and more prominent in England, even among those who are professed philanthropists. To build comfortable houses and put people into them at a low rate may look very benevolent, but the real work to be done is to find out how houses can be built healthily at a sufficiently low expenditure for the poorest class to rent them on terms consistent with proper economic conditions. Much has of late years been said, done, thought, and written on this head, but the subject perhaps has hardly been specially advanced during the past year. The publication of a new work on "Sanitary Engineering," by Mr. Bailey Denton, which we noticed at some length, has been an important contribution to formulating our knowledge and experience, up to the present date, on the serious practical matters included under that heading, and which must have a bearing on the construction of all classes of dwellings, large and small; and the fact that "half-timber" construction has received some degree of special attention, set on foot in a paper read before the Architectural Association, may be considered as having some bearing on the possibility of a cheap and at the same time picturesque construction, though we should be disposed to think that the solution of this problem was more likely to be found in the direction of such a material as concrete, provided only we can overcome the difficulty of giving an inviting and picturesque appearance to buildings constructed in this not very fascinating material. Another subject directly connected with the safety of town life, the prevention of fires, has received a certain impulse during the past year; the select committee on the subject having at least put on record resolutions expressing dissatisfaction with the present state of things, and recommending a radical reform whereby the fire brigade should become a part of the police force, and the supply of hydrants should be extended; but this latter question is involved in that of the new water supply, and the possibility of securing a constant and sufficient pressure for dispensing with engines altogether. To the special case of theatres and their dangers in regard to fire, we drew attention at some length in an early number of the *Builder* of the past year; but until this matter is in the hands of an authority strong and determined, and at the same time intelligent, there is little chance of anything being done, and our theatres will continue to be traps for the lives of their occupants, in the case not merely of actual fire, but even of a serious alarm. That there is an authority which interferes in the arrangements and programmes of theatres we all know pretty well; but unfortunately it interferes almost

* Most recently in some remarks on "The Supervision of Public Works," p. 391, *ante*.

always in the wrong way and about trivial matters, and seems content to let all the spectators have a chance of being burned, provided it can only keep the dancers' skirts long enough; and even in that humble matter success can hardly be said to be attained.

Several matters bearing upon what may be called the politics of the building profession have demanded more or less recognition during the past year. We have taken due notice of the elaborate and exceedingly well-meant attempt of the leading associated body of architects to formulate its rules on a wider basis, such as may, it is hoped, make them more fitted for general acceptance by those who represent the profession throughout England,—an attempt which, as we have already said, has been conceived and carried out in a spirit which thoroughly deserves success in the main, and it is to be hoped will obtain it, in spite of dissatisfaction at some of the minor details of the working of the new rules. The junior society of architects has also during the past year first put in practice an arrangement for direct official intercommunication with kindred societies in one or two of the largest provincial towns, which societies have thus obtained the advantage of being placed more directly *en rapport* with metropolitan architectural practice, besides the advantages to both parties which always accrue from members of the same profession in different places being brought to a closer union with each other. But, unhappily, whilst architects have thus been stretching forth the right hand of fellowship a little further towards each other, an old breach in the executive branch of building operations has shown itself, one is disposed to fear, in a more serious form than usual during the past year. The conflict between employers and workmen has been carried on with a persistency of purpose, and apparently a completeness of organisation on the part of the latter, which would be in the highest degree admirable if their object was a legitimate one; nor is it for us to say that from one point of view it is not so. The effort to get the best possible return for labour is only what we are all, in fact, bound to in duty to ourselves; and, of course, it would be absurd to argue that combination is in itself an illegitimate means to employ. But it has proved to be, at the best, a most wasteful means, a weapon which recoils against those who employ it; and when to combination is added intimidation of others who are disposed to work, and attempts to interfere with the employers' equally just right to get any work done by those who are best qualified to do it, the movement assumes an aspect absolutely immoral. On this aspect of it we felt justified in expressing ourselves in very strong language in reference to the unfortunately notorious case of the Doulton strike, which was simply an attempt by workmen who were inferior in a certain branch of delicate work to prevent the employers from engaging more highly-skilled persons to do it to their satisfaction. The real way out of strikes, we have said, is arbitration, regarding the question as one merely of wages; but having regard to such a case as the one just alluded to, it is obvious that, as a first condition, it is necessary that the men should be made (by disagreeable experience, if argument fails) to see how utterly illogical and at variance with right principle is the course they have been taking in endeavouring to bring down all workmanship to the level of the worst man, which is what strikes and the operation of trade unions have really been coming to of late.

The promulgation of a new code of model bye-laws for the regulation of building operations in towns has been of interest as an attempt to systematise in a better form than hitherto the requirements necessary for ensuring sound and sanitary structures in towns. From our point of view we have found these laws, into which we went rather recently, very ably framed, and calculated in general to serve the purpose for which they were put together, though we learn that in some provincial towns they are regarded as showing instances of oppressive over-legislation; but objectors should bear in mind that it is absolutely impossible in these cases to legislate so as to please everybody. A large majority of such laws are, in fact, rendered necessary simply because all people who build are not either competent or honest, and must therefore be hedged in by artificial barriers from wronging their neighbours, which can only be done by a hard and fast line. It is for a somewhat similar reason, because some obscure members of the profession have no consciences and no right sense of their responsibilities, that a cry has been raised during the year about another sort of "bye," namely, "bye-commissions," which, by persons who know the profession only through its least eligible or able members, is charitably imagined to be a peculiar vice of architects. The president of the Institute, in a public reply to these insinuations, left, at all events, no doubt that he and his compeers courted full inquiry by those who cared to undertake it, and who, by making the charge, in fact bound themselves to investigate or withdraw it. Another subject which is connected with the relation between the profession and the public, in regard to the rights rather than the duties of the former, is that of art-copyright, which affects architects in common with other artists, and has been made the subject of inquiry by a Select Committee during the year, the results of which are not, at the time of our writing, published.

If we turn from matters of modern and practical interest to those connected with ancient architecture and history, this year has certainly brought out much to interest all educated persons. It has witnessed if not the actual circumstance of Dr. Schliemann's remarkable "find" at Mycenæ, at all events its first detailed promulgation in such a form as to bring it home to the public mind. As we pointed out, when the facts first became known, the importance of this discovery in providing a missing link in the history of the development of early Greek art can hardly be over-rated. We have also had to chronicle the visit of Dr. Schliemann to the Institute of Architects to deliver his lecture upon his Trojan discoveries, and more recently the exhibition of these at South Kensington, in regard to which some remarks will be found in our next issue. Early in the year we had also the publication of Mr. Wood's interesting volume on his Ephesus discoveries, the honours of which he had indeed reaped some time before, but which were thus made accessible, in an eminently "readable" form, to the general public, from whom we are inclined to say they have hardly had the attention and recognition which was due to an Englishman who had made so remarkable a discovery under circumstances of so much difficulty; though from those best qualified to appreciate what he had accomplished Mr. Wood has received all recognition. And among the matters of interest connected with antiquity none has excited more general attention than the acquisition by England of the obelisk which we are now waiting to see put up,—*somewhere*: the whereabouts we still hope is not *yet* fixed; and that there is a chance of a blunder being avoided. Whilst, however, the English public are thus interested in the acquisition of an ancient monument from another country, by an odd but most characteristic inconsistency they have, through the medium of their representatives, chronicled once more the indifference of the majority of them to the preservation of the ancient monuments of their own country, in again rejecting (though by a much smaller majority) Sir J. Lubbock's admirably-conceived and much-needed Bill intended to secure this object, the importance and interest of which it seems impossible to bring within the perception of the House of Commons, as at present constituted.

Among meetings of the year which have had more or less interest for our readers have been the Rubens *fête* at Antwerp; the British Association meeting, at which (as before observed) the new scheme for a London supply of water was given out, but which did not otherwise bring forward so much matter of interest to constructors as is sometimes the case; and the Social Science Congress, at which, as usual, some very valuable sanitary communications were read, and where also several matters peculiarly interesting to architects and artists were brought forward and discussed in the art section. One of these was the question of the principles which should guide us in the restoration of ancient buildings: which we single out for special mention because it has been also so much treated of on other occasions that it may be said to have been one of the leading topics of the year in the architectural world. Whatever we may think of the motives of the gentlemen who have banded themselves together against all restoration, much cannot be said for the logic or common sense exhibited in their way of putting their case, which, if carried out to its complete development, would result simply in leaving all buildings erected before the present century to go to pieces, and which makes no distinction between buildings in daily use and those which are absolute ruins. The extreme views expressed by this association and its adherents have actually had in some cases the effect of driving into a defence of restoration those who had previously been most inclined to oppose it; and though the result of the agitation may have been to render those who were intending to enter on the repair of an ancient structure somewhat more conservative, and more careful to justify every step, than they might otherwise have been, the general impression in the mind of impartial observers has probably been that the movement was the work of some people who wanted a "cry" to come before the public with.

Besides the meetings above alluded to, those of the two leading archæological societies have been of fully their usual interest, and have occupied a corresponding amount of space in our reports; and the Sanitary *Séance* at Leamington has brought forward in a special manner matters of modern and practical importance. And, as a special feature of the year, we must not forget the Caxton Exhibition at South Kensington, which hardly received the degree of public attention which its great interest and unusual character might well have elicited, though its value was fully appreciated by those learned in the special branch of archæology which it illustrated.

During the year we have had to deplore the loss of two of the hardest and ablest workers in the field of architecture; two who, besides, had made themselves specially beloved and respected among a large circle of friends within and without the pale of the profession,—Mr. Edmund Sharpe and Sir Digby Wyatt,—whose labours and whose character received at the time the commemoration they so well deserved at our hands, both on public and private grounds.

If it be permitted, in concluding our brief summary of the leading points in the work of the past year, to make some further claim to have been not backward on our own part, not only in chronicling facts and criticising the proceedings of the day, but in originating suggestions which may be capable of further application, we may recal that, among other things, we have been able to present to our readers an interesting series of articles, still in progress, on the variations and changes in the "household," or the typical plan of house in different eras, with illustrative plans; a series which, we believe, when taken conjointly, will be found to present a great deal of information in a connected and comprehensive form, and in such a manner as to prove in every way matter for agreeable and interesting reading. We have endeavoured to keep the spur applied to those who are concerned with engineering education for India and with the construction of public works in that great dependency, if haply these things may, by dint of much speaking, be put on a more satisfactory footing than at present. We have drawn attention specially to the conditions requisite to enable architecture to contend against the most formidable of all its adversaries, earthquakes (p. 253),—a question which, seeing the apparent changes that are going on in the direction of these disturbances, may possibly come to have more immediate and local consequence for us than it has at present: and we endeavoured to turn to account a serious railway accident of the year, by an inquiry into the real and preventible cause of such a catastrophe under the circumstances in question. The subject of granite and its use in modern architecture, started in our correspondence columns, has attracted a good deal of attention and led to some practical conclusions in regard to the employment of the material for town architecture. Our comments on the subject of "peerage property," and the social and economic effects of accumulation of buildings in a few hands through the operation of leases, led to a correspondence which those who followed it must have admitted to have great practical interest, not the less that the main part in it was sustained by a writer "from the plough," expressing his own personal experience and observation of the difficulties to which we drew attention, and, as we may say, more than corroborating our views. The importance of local museums, and the part they play in the general education of the people, is another matter to which we have endeavoured to draw special attention. And there is one feature in our last year's numbers which we think our regular readers will hardly have failed to observe,—namely, that we have devoted a larger place and a more systematic treatment than before to "foreign affairs,"—to giving both accounts and tolerably numerous illustrations of architectural work on the Continent. Our efforts in this direction, we are glad to be able to

think, have not been without recognition and approval beyond this country; and it may interest our well-wishers to know that some article which we devoted to a description of the doing and working of the Paris stone-cutters and masons' club, drew from that body the warmest expressions of sympathy, accompanied by the more special compliment of a vote of thanks and a silver medal to the conductor of this journal.

In drawing attention to the endeavour, successful, at least, in this instance (as in some previous cases), to extend the influence of the *Builder* in an international sense, we may be allowed, in conclusion, to remind our readers of what we very much wish them—those who are members of the profession especially—to bear in mind; that our object always has been to extend the interest in architecture and cognate matters *beyond* the circle of the profession,—to appeal to as wide an area of readers as possible, believing that in so doing we are serving the best interests, not only of architecture at large, but of the profession in particular, far more truly than by limiting our columns to the discussion only of the points specially connected with everyday professional practice.

DRAWING AS AN ELEMENT OF EDUCATION.

That the Livery Companies of the City of London are happily awakening to the consciousness of being heirs of the great trade guilds of the Middle Ages, is about the best bit of news that, in these times of strikes and of contests, has for a long time reached our ears. They have been seeking advice, as our readers know, as to the best mode of directing their powerful resources towards the education of handicraftsmen. We can conceive nothing more consistent with the proud traditions of civic and corporate worthies than such a resolve,—taking, of course, the resolve as carried to a successful accomplishment. As to the power and resources of the Companies there can be no doubt. It must not be forgotten that all the most famous and time-honoured educational establishments in this country owe their existence to some such initiation as that now proposed. And the activity which, in spite of many errors and shortcomings, has yet done much to raise the general educational level of the entire country during the last five years, has circled and gathered round these ancient foundations. Had we had no universities, no College of Physicians or of Surgeons, no Inns of Court, no institutions for handing down the oral tradition of learning, and keeping alive the lamp of study, our recent efforts must have been altogether vague and tentative; and the results even far less satisfactory than they have been.

But this question of technical education is new. It is a feature of our day. The cause we take to be this. A mode of handicraft instruction was provided by the old guilds and corporate institutions, which has gradually faded away. In any progress, real or pretended, slow or rapid, there occur demolitions, and when demolition commences in a complex structure, no one can say where it will end. We have of late been sweeping away, as barriers to progress, relics of what formerly were directly educational institutions. Thus we are apt to exclaim against a provision which should exclude any but members of a certain company—let us say in the City of London, by way of example—to exercise a certain craft within that city. Let us put the case of a man of national importance, such as the present First Lord of the Admiralty, or of European fame, such as Baron Tauchnitz, being forbidden to sell newspapers or books within the City of London, unless he were free of the Stationers' Company. At the present time it would be said that such a thing was an incredible relic of the ignorance and superstition of the past. But is that really so? What was the origin of those firm and ancient bonds which we have of late swept away like so many cobwebs? One reason, if not the sole reason, for their original establishment was the ensuring of handicraft education. Each craft, three or four hundred years ago, had not only its admitted principles, but its practice, and also its secrets. To publish those secrets was regarded as a social, or, indeed, a moral offence. The idea of writing handbooks, in which rules should be given by which a man might teach himself to brow, or to work metal, or to build, or, in fact, to become a craftsman of any kind without duly entering into the craft by the appointed door, was undreamt of, and would have been fiercely resented, as well as loudly ridiculed, had it been suggested. And it must be admitted that there is very much to be said in favour of this old-fashioned view. No private study can supply the want of oral teaching and practical training. Of old time, thus, a lad who wanted to become the master of a craft entered by way of an apprenticeship of at least seven years. From the 'prentice he rose to be a journeyman, and thus, by slow degrees, to become a master. A thorough training was thus secured, and in shutting the door against interlopers, the guilds were not only protecting those who had devoted the long time then considered necessary to acquire the practical knowledge of their craft against quacks and interlopers, but at the same time they were supporting the best mode of craftsman-education then known to the world.

Now between that old form of craft education which resulted in the system of apprenticeship, guild organisation, and corporate privileges, the spirit of modern society has waged active war. It has destroyed much,—without replacing what was of essential utility in a system which the increase of population had, perhaps, out-grown. And we have seen, and lamented, the activity of what may be called a fungoid vegetation, as contrasted to the slow, but well-directed growth of the tree. Our trade organisations of late years,—whatever their real aims, and whatever their outcome for good or for evil,—have not been organisations for craft education. Some such institutions, indeed, have sprung up and flourished on the Continent. Such are the schools for the children of the workpeople of Herr Krupp, which are attached to the enormous works of that great German engineer. And nothing can be more sure than that, if in one country we find a careful, well-arranged system of craft education faithfully carried out, while in another we find all craft organisation directed to social or political purposes, leaving education aside,—or even discouraging a workman, as a rule, to do more, better, or cheaper work than his neighbour,—the first-named country is on its way to thrive on the ruin of the last.

On this view, the City Companies are in a position to exert a most wholesome and beneficent influence, if they really betake themselves to the subject of technical education. For the members of each Company, or rather the delegates to whom the preparation of the schemes would be naturally committed, would be in a position to say what would be the proper culture of so much of the educational course of a lad as was special to their own craft. This would lead to that on which we have before insisted as an essential feature of any sound general scheme of education, namely, the division of the course into steps or chapters. It is now admitted that the nation has a duty towards her children. She has to educate them. This may be called a newly-defined duty. But, at all events, that is where we now stand. It is admitted by all our recent legislation, and confirmed by a large and annually-increasing expenditure of public money. But the question has to be put, "Educate for what?" It is this question which, we venture to think, the modern movement has to a great extent blinked. It is this question which any sound system of handicraft education will directly raise. It is, no doubt, a theory which has been carried out in places which it is unnecessary to particularise, that you should educate every child up to a certain level, and then turn him out for a fair scramble for the good things of life. Thus, it is said, the soldier carries the bâton of the marshal in his knapsack. Let us admit that this is sometimes the case. But then it is the *soldier* who does this, not the bricklayer. The utmost that the latter could hope to carry would be, after long mastership of the trowel, the pen with which a great master builder should sign checks for the weekly payment of his men, or tot up his net balance to profit at the end of the year. There is, it is true, a point up to which the education of the young soldier and the young bricklayer would be identical. But this is a point very near the zero of the educational scale. What is required, therefore, to economise the educational power of the country is, so to regulate the primary education as to teach all that is required up to the point when the craft-education branches off. The craft-education, again, while it has a specialty of its own, never requires to reach the point of scientific education. Let us admit that the craftsman and the surgeon, for example, at the same portion of their lives, ought to be occupied in the acquirement of the same grade of education, they will not be engaged in the pursuit of the same species of knowledge. Thus when we hear of such a training as should awaken the understanding of the aspirant, and give him a real interest in his pursuit, we are asked to travel, we think, a little wide of the mark. That awakening of the interest depends far more on persons than on schemes. It depends rather on the teacher than on the curriculum. It is one of the greatest gifts of a born teacher, as, on the other hand, the ready response to the attempt to awaken interest is the indication of what may prove to be genius in the student. Nothing can be more desirable than the awakening and sustaining of this personal interest. Such was one of the aims (and very well secured, too, in the main) of the old guild and apprentice system. But if a course of education be schemed with a view of awakening interest, there is no small danger of its subsiding into the sensational, the dramatic, and the practically useless. A certain amount of drudgery has to be gone through. The only way is to face it. All that can be done to illumine the work of the pupil by the intelligence, the kindness, and the fancy of the master, is well added, But the work must be done,—well done, thoroughly done. Nothing will make up for the want of hard, patient plodding work; and the object of the handicraft course of learning should be to provide that this requisite course of hard work should be given to the objects most useful to the successful pursuit of the trade itself.

For a quarter of a century we have maintained that an elementary course of drawing might be made with great advantage a branch of early, nay, almost primary education. Such is the case, we believe, in Switzerland. And this may be supported for more reasons than one. There is no craft of any kind in which it would not be to the advantage of the craftsman, at all events if he had attained a certain eminence in his craft, to be able to make a sketch of a bit of work he had to do. Whether it be the smith who has to forge a horse-shoe, the bricklayer who has to build a culvert, the saddler who has to invent some convenient martingale, or riding-strap, for a particularly troublesome horse, — or whatever other instance we may select in which a customer may come to a craftsman and say, "How would you propose to do so and so?" the power of taking a pencil, or a bit of chalk or of charcoal, and making a free-hand sketch, and also of making a sketch to scale, would be of definite utility to the craftsman. Thus as an essential, rightly viewed, of nearly every imaginable part of technical education, an elementary introduction to draughtsmanship would be of signal value. This, then, is the first reason why drawing should be a part of the primary curriculum. It will be of use to the student, at whatever point in the ascending scale of tuition he may afterwards fall into his own special groove.

But there is something more than this in the use of the pencil. Lord Bacon, commenting on the excellent value of the three rudimental acquisitions,—the three Rs, as they have been familiarly termed,—observes that reading makes a full man, spelling a ready man, and writing (under which, of course, arithmetic would in this case be included) an exact man. Far more, however, than the practice of writing, until we come to a very high place in the educational scheme, such as instruction in the writing of reports, *précis*, or specifications,—is drawing calculated to make a man at once exact,—full and ready. We very much question whether any vivid and exact conceptions of either form or size are, as a rule, entertained by those who have never been in any way trained either to draw or to measure. There are, of course, exceptions, in the case of persons with naturally well-developed perceptions of form, size, or weight. But when these functions exist in the mind in a naturally wakeful state, the response of the pupil to the lessons of the drawing-master will be rapid, and even brilliant. We are speaking of the great majority of cases. If it be asked what is the size of a stone, or of a bit of timber; whether a certain bit of cloth is large enough to cover a certain area, or to patch a certain hole; whether a book of such a tallness will stand on a certain shelf; we know, from certain experience, that the wildest guesses will more often than not, be made, even by educated people. And the reason is,—that the eye is not educated to that exact observation which is necessary to the formation of a correct idea. The mental image is vague and shadowy. Still less is the hand trained to express that idea,

whether it be shadowy or otherwise. The fact, then, of setting a child, even of tender years, first to trace the outlines of some simple object presented to his attention on paper or on a slate, and then, when some practice has thus awakened the habit of attention, and familiarised the effort of dilineation, to add exactitude of size by the wholesome canon of the two-foot rule, would probably prove a more efficient stimulus to the power of attention and of control of the use of the hand, than any other that could be substituted for it. It is not with the idea of making all boys or girls draughtsmen or designers, any more than with that of making them all architects, builders, or tapestry workers, that a pencil should be put into the youthful hand. It is for the purpose of teaching the holder how to see, how to realise, the form and size of a thing,—and thus to know something more about it than would otherwise be the case,—that this should be done. And in this, again, two advantages accrue to the pupil. First, by this attention, he learns more about all the objects which he is made to study than would otherwise be the case. Secondly, his attention will be on all occasions more awake, more ready, and more exact, so that his eyes will give him more accurate knowledge of any object that comes within this range, than would otherwise have been the case.

It is evident that the admirable utility, in so many ways, of the adoption of elementary drawing as an integral branch of the most simple and primary education, would be still further apparent if the education advanced beyond the plane of craftsman teaching, to that of professional, or higher technical, skill. How much of the time of the architectural or engineering pupil would be far more usefully employed than it is at present, if on his entry into his pupilage or apprenticeship he had not to make his first acquaintance with the drawing-board and the T-square. A precious portion of time which might be devoted to storing up information of the utmost value, is given by a lad of fourteen, sixteen, or even older, to the acquisition of an elementary handiness in the employment of those simple instruments which probably would have come more readily to him if the lessons had been first given at seven or eight years of age. It is always difficult —it is *the* difficulty in an analysis of educational phenomena—to tell how much of the ease that attends on the draughtsmanship of a lad who begins to use his pencil at a very early age is natural, and how much is acquired. We cannot divide the profits of the partnership between genius and perseverance. In the ordinary course of things, the desire of a child of four or five years old to use a pencil (which may perhaps be checked by a box on the ears for having made an easel of the panels of the drawing-room door, or the paper on the staircase) is probably an indication of natural bent; that is to say, of incipient genius. But the child, though there may be (as in cases we have in view) a certain amount of "go" in his earliest efforts, only slowly and with difficulty acquires the command of his pencil. This slowness and difficulty could hardly be much more if, instead of being driven by an instinctive wish to copy, he had been gently directed, and taught to copy. The born artist would get on quicker than the child of no taste in design. But the actual process of the education of the eye and hand would be found in practice to differ far less in different children than is now assumed to be the case. And, supposing that after four or five years, the non-artistic child had fallen behind the born-artistic child to the extent of 50 per cent. in his facility of using the pencil,—what an enormous gain would that half result prove to him throughout his following life!

There is yet another consideration of very grave importance, which has not, so far as we are aware, hitherto been mentioned. The increase in the number of young persons who wear spectacles is said to be great. In the German universities, and in at least one of our own great colleges, famous for the severity of its examinations, almost every student wears spectacles. Shortsightedness is known to be a disease incident to childhood. It is brought on by certain habits, which are, in fact, those of the student. It is urged by competent judges that the human eye is altering, and that for the worse, under the strain upon the child. There is no doubt that shortsightedness is hereditary, so that each child who has his eyes riveted on a book for a certain time every day is doing harm both to himself and to his future descendants.

Against that kind of monotonous straining of the eye which attends the effort of learning to read, and of continuous reading, the use of the pencil is the best protection, for it requires rapid change in the focus of the eye, which is the great protection against a gradual shortening of that focus. Proper exercise of any organ or faculty is the best preservation of such organ or faculty. Over-use in one direction, and disuse, are both functionally injurious, and are likely, by persistence, to cause injury to the structure of the organ. Independently, then, of the claims of the draughtsman to take an important share in the education of the youth of the country which have hitherto been urged, there is one founded on sanitary, or rather on physiological, reasons. Drawing gives an exact knowledge of size, of form, and of external character in general, which nothing else will give. To learn drawing not only thus to some extent furnishes the mind, but it imparts a power of constantly acquiring exact information which no other study can give. And, lastly, the early practice of drawing is calculated to counteract that increasing tendency to shortness of sight which is fostered and aggravated by the riveting of the eyes of a child, for more than a brief period, without interruption, on the pages of a book.

THE VICISSITUDES OF WESTMINSTER AND WHITEHALL.

IN the course of an editorial existence, however short, many strange things are encountered and some strange people are interviewed. Towards the close of a year mad brains prepare to put on festive raiment; mad wit follows. It was undoubtedly a madman who last week caught us by the button-hole, and gesticulated rather than said that he was the original genius of a Select Parliamentary Committee, a lineal descendant from him who produced the first vestryman, and a stanch supporter of every municipal institution which bore on its shield an hereditary abracadabra of "DIRT, DECREPITUDE, AND DELAY." Necessarily we bowed the bow of attention; we murmured a request—which, to the inevitable horror of all sane men, has been conceded,—that our assailant would put his business in writing. The result is a complete and an unprecedented inability on our part to decline printing

A TALE OF OLD TIME.

Many hundred years ago, when I was younger than I am now, though it was not so "merrie" in England as it is to-day, yet the machine of constitutional government was easier to work, and the will of the wiser men was more quickly enforced, than has been possible, of late, for scores of dull years. I had very little to do in days when churches and cathedrals, palaces and castles grew, bit by bit, upon the open sward, and spread till their dependencies touched. Ah! What a fuss has been made about the remnants that have been preserved to you! If you sanitarians, deluders and deluded as some of you are, could have seen the hovels in which the common human cattle lived,—the men, nevertheless, who fought at Crecy, and who came safe home from Agincourt,—the men, too, who built the Abbey there and the big Hall of Westminster,—you would confess that Nature had a pretty efficient way of her own in overcoming her enemies and working for the general good. But now, forsooth! you pooh-pooh Nature and glorify Art; your creed is that the man, who dare not for his life face the elements, shall breathe his native air filtered through a wall, a crack in a door, or a hole in a roof; and that he, who is the most naturally decrepit is the most deserving of care, both for his own and for posterity's sake. So much for the Survival of the Fittest! For, under your artistic care, the Fittest will not survive. Come back, Memory! to the time when King Edward, third of his name, dismantled a large part of Windsor Castle,—a most uncomfortable residence both before and after he took it in hand. A whole host of workmen are busy at alterations and new buildings all round the Castle Hill. The king has, therefore, come to Westminster, and there will be revels in Hall: jousts, tournaments, and feastings, to last three weeks at the very least. I can see a crowd of holiday-makers straggling along the meadows all the way from Fleet river to Westminster-gate. Urchins are jumping a rivulet which you have long since made a drain; there are a couple of sweethearts just descended from below Strand Bridge, and longing to look into the water, where there will be nothing for them to see but the reflection of themselves. Ivy-bridge, but it has not a name yet, is gay with coloured dresses. I enjoyed the sports then so much that I do not care to remember how low and sensual they were; how contemptible were King and Parliament, knights and people, priests and penitents, in those days. Nevertheless, it is pleasant to remember Geoffrey Chaucer under the big tree in the alley you call Poet's-corner; for Chaucer's hut stood almost on the very spot where they laid the body of Henry VII. Chaucer was in the Office of Works, and on the establishment, too. I saw them, both king and poet, carried to the grave. Time presses though; King Hal is already come to Westminster. The river is alive with barges and small craft; and the monarch's rough joke reaches even the Clock-house that the first Edward built.

Hush! the Cardinal is dead; Henry has won his second love and worn her. Another has succeeded and is gone. A few years and we shall be half through the sixteenth century. A great revolution is taking place; the mischief will be felt for a hundred years, or even more, before the nation can be the better for it. The Church lands are partly distributed among the heads of the nobility. York-place, the metropolitan residence of the Northern archbishop, is transferred to the king, and the Palace of Whitehall will soon command the very gates of Westminster. Henry VIII. had reigned seven-and-twenty years before Parliament gave him an Act to appropriate all the buildings and land on either side of the highway from the Cross at Charing to the doors of Westminster Hall.

It is a story of kings, therefore, and of princes, of archbishops and priests, of noblemen and their dependents, that I tell. But I take it for granted that you know what has been accepted as history by successive generations; and if, speaking as I do from memory, some miserable bookworm of the modern fashion catch me tripping at dates or kings' names,—mere conventionalisms,—I say:—Respectable twaddler, you never smelt Long Ditch, though your grandfather perhaps did; you never saw the King's Street in days before the Select Committees of British Legislation straightened it, cleaned it, drained it, rechristened it, and prepared it to become what a hundred years or so after the death of Lord John Manners,—whilom poet and Chief Commissioner of Works,—it may become: THE MOST MAGNIFICENT AVENUE IN EUROPE!

The original Palace of Westminster formed the sides of what you call Old Palace-yard. The additions made by Henry Tudor lay on the side of St. Margaret's-lane, between it and the Hall. Then it was that New Palace-yard attracted the crowd. From the old Clock-house, close by the fountain which priestly wit caused once to run with wine, I could see then new buildings on all sides. I saw the big Gate-house rise that connected the gables, where the stables next Gwydyr House now stand, with the Tilt-yard on which is your modern Dover House. The great archway for coaches and horses, and smaller passages for pedestrians, remained for nearly 200 years the only entrance from the City of London to the City of Westminster. You moderns have christened it Holbein's Gate. There was a second Gate-house called the King's-gate, which formed the entrance to the King's-street; the road between the two Gate-houses was enclosed on both sides by a wall, having the Privy-garden on the side next Thames. The Cockpit, the Tennis-court, and other buildings lay on the side next the King's-park. The original Whitehall was in the Palace of Westminster,—a hall afterwards the Court of Requests, then the House of Lords. New Whitehall spread along the river side from Westminster Palace to beyond York-place and Charing village, where the king's falcons were kept. A lane, running between hedges, joined the two Gothic churches of St. Martin's and St. Giles'. The gardens of York-place sloped to the water's edge. Further on lay the precinct of the Savoy, some of its buildings washed by the river. There was Somerset Place, its courts and gardens extending from the High-street (now the Strand) to the Thames side; then Milford-lane, and Arundel Place with its gardens running down to the water. Then Paget Place, to be changed to Leicester and again to Essex Place, stood in its gardens next the Temple, and near the Bar. The houses then clustered round St. Clement's, but St. Mary's

was gone, for Somerset, like a sagacious Protector, took it and the land around it to build his Palace. One well-filled building was then thought better than two half empty churches. Pleasant flowers and trees brightened the river; they gave London the reputation for openness and extent that it enjoyed, under Elizabeth and James, among foreigners accustomed to the walled towns of the Continent. Indeed, it was in those days that some of the citizens got a first hankering to live away from their City. Even in the seventeenth century the suburbs became larger than the body of London, and the capital was compared to a Jesuit's hat whose brim is larger than the block. It was Count Gondamar who told his Royal Mistress of Spain that there would be no City left shortly, for all had run from the gates to the suburbs. Indeed, he proved a true prophet. Not many years after, a vast space, denuded of every tenement, lay charred and smoking in its very heart.

Fire gave the opportunity for reform. If people had then appreciated the value of Select Committees and Royal Commissions, the rebuilding of London might have been delayed for forty or fifty years, in order that the thing should be done with scientific method and completeness, and with a view to rigorous economy in its execution. But everybody was in a hurry to begin, and much was made a matter of jobbery and interest. Those churches which were in the gift of a great man, even those that stood in a cluster, were re-erected in preference to others which, before, had not been large enough for their congregation. The City rose again upon its old lines. There were paper plans, but there was no one to initiate or even suggest action; there was no one to reconcile the conflicting claims and obligations of a divided population eager to repair the loss it had sustained. The rebuilding is going on, and the seventeenth century has yet thirty years to run. I shall use them to tell you

A TALE OF WHITEHALL PALACE.

When the Chevalier de Grammont astonished the Court of Charles II., winning hearts from the women and money from the men, a crazy congeries of courtyards and buildings, spreading from Richmond-terrace to Northumberland-avenue inclusive, composed the king's residence—a "palace" as disconnected and unwieldy as it was picturesque. James I., by the influence of his consort, a foreign princess, tried to build a real palace. Inigo Jones made more than one attempt to satisfy his royal patron. He produced one block of building which, like "the finest site in Europe" of subsequent years, is still regarded with admiration by the inimitable complacency of British nature. The space now called "Whitehall," between the Horse Guards and the Banqueting House, was at that time enclosed on three sides. There were some tumble-down old posts, running from Whitehall Gate to Westminster Gate, and they formed a square enclosure in front of the Banqueting House. Within that enclosure I saw Charles I. die. Some time afterwards his son ordered Sir Christopher Wren to devise a mode for building a new palace on the lines set down by his master, Inigo,—a mode which would have incorporated the Banqueting House, a building useful for feasts and orgies such as the Stuarts and the Bourbons loved. Sir Christopher did as he was commanded. Years afterwards, like a patient official, he made two more designs by order of another king, Dutch William Henry by name. Time, though, did not lag, and, eighty years after Charles I. died, cannons were pointed—I think they were sham cannons—across the scene of his execution, from the brick wall that joined Westminster Gate to the Banqueting House, barring the view of Westminster more effectually than Temple Bar even now divides Fleet-street from the Strand.

Just before the second Charles died there was a gatehouse into Scotland-yard not dissimilar in plan to that which exists; but the yard was an open spacious quadrangle. There was another gatehouse leading into what is now Whitehall-place; and now the south side of that place is built upon what was then an open space. The circuitous path from Middle to Little Scotland-yard existed, but through dwellings and offices grouped in picturesque disorder, not through stables, sheds, and a tumble-down museum, as at present. Buildings lined the river from Scotland-dock (at the river end of your Whitehall-place) to the Bowling-green, which was divided from the Privy-garden by a wall. That wall ran almost along the boundary line which now separates Montagu House from Richmond-terrace; and the nation's new Opera-house-foundations lie just without the southern boundary of old Whitehall Palace. Thereabouts (I cannot swear to the exact spot) the Thames flowed in, and mixed with the filthy stream that ran down Gardener's-lane under King-street Bridge, at the foot of the lane, and turned into Channel-row, where the canons' houses were in earlier times. Some of this land, which the Stuart inherited from the Tudor, who got it God only knows how, Charles II. gave away in easy leases to his favourites and children. But a more certain power than kings wield determined the fate of Whitehall. A great fire broke out some three years before 1700; it destroyed the whole palace except about seventy rooms and the Banqueting House. Little by little, buildings got up again, anyhow; my lord This or my lord That found it convenient to remain where his father had been so cheaply lodged. The big houses called Whitehall-gardens stand on the Palace walls; the Duke of Montrose lived on the land where his brother duke of Buccleugh has lately built Montagu House. A Duke of Richmond clung to the spot where the family progenitor and patron had lived and died; Richmond-terrace now marks the site of Richmond House.

The Earl of Rochester's house succumbed only when the way (now Parliament-street) was opened through the Privy-garden into New Palace-yard. It stood at the foot of Downing-street, in the very middle of the present roadway, and formed the corner of King-street,—the only thoroughfare to Westminster until about 1750. Holbein's Gate-house stood also in the roadway; the buildings which before connected it with the Banqueting House were removed only at the beginning of this century. Then it was I saw them take down the King's Gate that covered King's-street between Lord Rochester's and the foot of Downing-street. That was about 1723. People at last gave up all hope of ever seeing a new Palace of Whitehall; the Court had flitted to St. James's and to Kensington.

Over against the park side of Whitehall a new Admiralty was built on the site of Wallingford House. Between it and Holbein's Gate-house were barracks and stables for a detachment of Life Guards and Horse Grenadiers. Under the Dial was a big room where preaching was held on Sundays. The Board of General Officers and the Courts Marshal sat there; and the office of the Judge-Advocate-General, a political sinecure of to-day, was there lodged. The Banqueting House became a chapel for the Georges. Down by the river, where the Woolstaple is, on the bridge of which so many chroniclers have written,—but it was only a wooden jetty,—there is stir and movement. The weathercock in the Privy Garden, which James eyed so often, to see the way of the wind that brought the Dutchman to grateful England, had been long pointing to change. A real bridge is contemplated, to relieve the horseferry that so long formed part of the revenues of Lambeth. Some old tenements must fall, and some narrow lanes must be widened. Authority will take its time. For the present, a bridge to connect the Surrey side with Westminster; a straight street from the bridge to King-street, and afterwards to Storey's Gate; and a street at right angles, to join Whitehall with Westminster, are all that can be accomplished before the eighteenth century has spent half its course. Forty years before the bridge was built, the Clock-house in New Palace-yard, as well as the Palace Gatehouse, at the foot of Union-street, near the corner of St. Margaret's-lane, were removed. They left a decent interval between the ravages of reform. Nevertheless, New Palace-yard has got a brand-new side of private dwelling-houses, and brand-new houses front them on the opposite flank of Bridge-street. The remains of the old gate, by the river-stairs, are levelled; the Round Woolstaple is sold for 840*l*.

Holbein's Gatehouse is gone; Parliament-street is pierced. No more shall the kings of England pass through King-street to Parliament, and all the filth of Dirty-lane heaves to and fro, because, of a surety, the millennium is at hand. There were many there who could have told

A TALE OF WESTMINSTER PALACE.

St. Margaret's-lane was full of people when George II.—dapper little George he has been called since—went to open Parliament some short time after his coronation. His Majesty's Surveyors laid faggots in the deep ruts of King-street, so that the state coach and its eight gallant horses might not stick fast in the mire. When the king was got well through Union-street, his cattle and conductors were fairly puzzled how to enter St. Margaret's-lane. Hell and Paradise lay to the left of them; and as the coach blundered on, the people held fast to the wooden posts that divided the narrow foot-passages from the narrow roadway between. You know Paternoster-row of the present time, and its iron posts between house-front and kennel; imagine the same things in wood begrimed and besmeared. The mud lay deep as far as Heaven and Purgatory, between which and Henry's Apse the Majesty of Britain was borne obliquely to the entrance of the House of Lords. Here, however, there was a little difficulty, for eight horses require not only some circuit of turning-space, but also some length of passage-way. Their eight noses were directed into Dirty-lane while the king descended; free of the royal burden they entered the courtyard of Abingdon House, which used to be on the west side of the lane. Thereby it was possible to turn the coach and so reconduct Majesty to its home. Dirty-lane was about 15 ft. broad from house to house; it was the habitation of the poorest and vilest of the population. St. Margaret's-lane had an advantage over it in breadth of three and even more feet. Twenty years after the coronation of George II. that picturesque lane became St. Margaret's-street, and Dirty-lane was rebaptised as Abingdon-street. In 1793,—just sixty-five years from the day when the inconvenience attending a royal progress to Parliament was felt,—the latter street was still further freed from obstruction.

Nor had the Office of Works failed to take cognisance of the increasing exigencies and requirements of Parliament. The happy union with Scotland had swelled the number of national representatives; and though Sir Christopher Wren raised beautiful wainscot galleries in the Commons' House, which was well matted under-foot, and held 513 gentlemen, yet the wainscoting only concealed the ruined condition of its carved and painted walls. In 1739, the Lords Commissioners of the Treasury directed the Office of Works at Whitehall to prepare designs for a new Palace at Westminster. They were prepared to the recorded satisfaction of the Treasury. They included a façade to the river; the enlargement of Old Palace-yard; the widening of its approaches; and the retention, if not restoration, of St. Stephen's Chapel. The designs, which an impartial critic called "truly admirable," were estimated to cost 167,067*l*. The nation paused to consider a renovation which was to be attended with an outlay so prodigious, preferring, some eighty years afterwards, to spend all but 17,000*l*. of that sum upon the coronation of George IV.

Just a year or so before the French Revolution I saw sorry and sad sights at St. Stephen's. The mob penetrated to the very doors of the Houses; even orderly people peremptorily demanded that popular representation should be made free of aristocratic patronage and corrupt influence. A large increase in the number both of the Commons and the Peers rendered it necessary to make alterations in the Palace; operations commenced in August, 1800. Happily by an Act of 1782 a new Office of Works had been constituted; the first Surveyor on the establishment was Sir W. Chambers. In March, 1796, Mr. James Wyatt was made Surveyor of His Majesty's Works, and under his orders a new House for the Lords was arranged within the old Court of Requests. The interior of the House of Commons (St. Stephen's Chapel) was enlarged. The mutilation of the remaining Mediæval buildings was accomplished with admired precision. St. Stephen's Cloister became a kitchen-yard: the kitchen was a shed abutting against the little Oratory, the lower story of which was converted into a scullery. The huge buttresses of the great Hall were defaced and partly cut away; paintings and sculpture gave place to wainscoting, windows, and stairs. The east window of St. Stephen's was partly filled up with brick-work; three small round-headed windows were inserted; a doorway was cut through the altar wall; holes were made in the octagonal angle-turrets; the parts of the interior which formed Mr. Speaker's residence were duly plastered and renovated. At the end of the last and the beginning of the present century St. Stephen's bell-tower was Mr. Speaker's best staircase; Mr. Speaker's new house ran round two sides of St. Stephen's cloister. Mr. Speaker's garden extended upon an embankment to the

river; but originally St. Stephen's Chapel and the adjoining houses of the vicars were washed by the river, or, at least, only a narrow terrace existed between them and the Thames. The coffee-houses and public-houses which had remained for so many years on either side of the great entrance to Westminster Hall were removed. New coffee-houses occupied the corner where Hell and Paradise and the Coach and Horses public-house rotted before. Heaven and Purgatory were gone; but the Star and Garter public-house flourished next the King's entrance to the House of Lords. A newer building stood on the site of Cotton House; the Cotton-garden remained bounded on one side by Mr. Hatsell's garden, and on the other by Mr. Delaval's house. The only direct entrance from Whitehall to the Broad Sanctuary lay through King-street. Some alleys led into it from St. Margaret-street and a break between the cluster of houses, on each side of St. Margaret's Church and the Abbey, formed a narrow passage from the Old Palace to the churchyard. At the east end of the church was attached the Ordnance Office, not, however, the same Ordnance Office that originally formed part of a group composed of Waghorn's coffee-house, the King's entrance to Parliament, the Ship public-house, and the Cæsar Head.

The sure and steady hand of improvement was at work in the twelfth year of the present century. About eighty years after the plans for a new palace had been approved by the Treasury, Sir John (then plain Mr.) Soane erected in the Grecian style of architecture a new royal entrance, a king's staircase, a royal gallery, a Lords' library, new committee-rooms and offices. Many remains of the ancient palace were then necessarily destroyed. The spirit of progress was astir; the wave of British democracy was rolling, and in '32 gaily rode the good ship that bears the name of

REFORM.

Two years more and an unaccustomed light beamed upon the floor of the House of Lords; doubts were freely entertained whether it could mean "fire." Mrs. Mullencamp, doorkeeper's wife, expressed a conviction to Mrs. Wright, deputy house-keeper, that the House of Peers was on fire. Mr. Richard Weobley, Clerk of the King's Works, observed that a chimney near the Lords seemed to be very much on fire. An inscrutable decree of Providence then made as great a hole in the Palace of Westminster as that which had been made in London, by the same means, 168 years before. On the next day the Office of Woods and Works showed, in a masterly and an exhaustive report, what had and had not been destroyed by the flames. The public mind was calmed with an official assurance that the strictest inquiry was instituted as to the cause of the accidental calamity.

But there was mental agitation in the world of bricks and mortar. After ninety-five years of patient expectation, the architects of Great Britain were unexpectedly, and many said prematurely, put upon their mettle. A Select Committee having considered and reported that plans for a new palace should be delivered into the Office of Woods and Works on or before November 1st, 1835, the Government, in less than two years afterwards, conferred upon Mr. Charles Barry the appointment of Architect, — just ninety-eight years after the truly admirable plans first ordered by the Treasury had been approved, shelved, and forgotten. In the year 1849 began the squabble about the payment of a just remuneration for the architect's services. In full vigour, nine years after, it received in 1857 the assistance of the late Mr. George Russell. His part in browbeating and bullying an honourable man whose great work gave the first and necessary impetus to recent art-education in this country, was performed with accomplished vigour. The disputes which shattered Sir Charles Barry's health did not terminate with his death. The legacy he bequeathed to his son terminated with dismissal at the hands of Mr. Ayrton; and a further squabble about the ownership of Sir Charles Barry's drawings for Westminster Palace ended in the official triumph of Whitehall-place.

The horizontal lines of the Palace were sadly marred, so many said, by the ungainly curve of the bridge that hid the new building from the Whitehall bank of the river. A hundred years and more had elapsed since the bed of Thames received its first burden of

WESTMINSTER BRIDGE.

I was quite a child in the year when Normans sank, —and they continued for many a long year after, —rubble, lime, and sand in the river between London and the old South work. For nearly six hundred years London could boast of only one bridge. It had noble gatehouses, and a chapel, like the early bridges of France. The houses remained upon it till four years after the bridge at Westminster was finished. The width between the houses was not more than a score of feet; the bridge had twenty arches. About 1738-9 they laid the first stone of the first bridge that Westminster built across the Thames, and the last in 1747. The bridge was open three years afterwards. It had thirteen arches and two smaller arches; it had a carriage-way of 28 ft., and footpaths each of 7 ft.

The light of progress that, forty odd years ago, illumined Westminster, was not powerful enough to cross New Palace-yard. The fire that destroyed Westminster Palace spared Bridge-street and the bridge. A Select Committee felt the inconvenience of the fact about the year 1844; so did another in 1846; and another in 1850. The Commissioners of Metropolitan Improvements sat to hear evidence and receive advice. In November, 1846, proposals were made to build a bridge at the Horseferry and another at Charing-cross. It was also proposed to abolish Westminster Bridge. The landed proprietors of Bridge-road, Lambeth, would not hear of such a thing; they appealed with success. Mr. Thomas Page, C.E., showed the necessity of a bridge across the Thames at Scotland-yard, and suggested an approach to it from Charing-cross by a street running parallel with the south-west wall of the Duke of Northumberland's garden. Sir James Pennethorne even thought that a street right through Northumberland House to the suggested bridge was required, but he put forth the idea of expropriating a Duke as Utopian and impracticable. By such a bridge the saving to people coming from the heart of town would have been one-sixth of a mile as compared to the route by Westminster Bridge, and one quarter of a mile as compared to that by Waterloo Bridge. Had Northumberland-avenue led to such a bridge as the one advocated by Mr. Page and Sir James Pennethorne, the land on either side of the Avenue might have been let by this time. But the Commissioners of Metropolitan Improvements urged the claims of Belgrave-square. Take away the bridge from Westminster and people who had carriages and horses would have to go a sixth of a mile out of their way when they chose to visit the New Cut or the Asylum for the Indigent Blind. Engineers and architects, however, urged with some audacity the greater claims of all London over those of a suburban square. Belgravia won. From the 5th to the 23rd of July inclusive of the year 1850 a Select Committee sat principally to consider the report of a Select Committee that sat in 1846 on Westminster Bridge. Thirteen witnesses were examined, and a folio of seventy-five pages was published. In 1851, a Report of the Commissioners who considered the best and most convenient site for a new bridge at Westminster was presented to both Houses of Parliament by command of the Queen. The Report noticed with becoming acumen that three Committees of the Commons had previously sat upon the subject. In 1853, another Select Committee examined twenty-three witnesses, and on the 16th of June of the same year published its minutes.

The bridge question was now fairly started for elucidation. On October 18th, 1854, the contract was signed, and among other conditions, the new bridge was to be ready by June 1st, 1857. On July 1st, 1856, a Select Committee inquired into the actual state of the new structure and the course to be adopted in relation thereto. The inquiry which, with its index and appendix, occupies 123 folio pages, resulted in the opinion that the further progress of the works of new Westminster Bridge should remain suspended until the Government had had an opportunity of considering and deciding on the advice to be offered to Parliament on the subject.

On Friday, the 17th of July, 1857, it was resolved that a Select Committee be appointed to consider the state of Westminster Bridge, and the course to be taken in relation to the works which were suspended. In 1858 the works were again in progress; and the bridge was opened for traffic towards the middle of 1862. Thus this desirable consummation was attained eighteen years after the necessity of its existence was admitted by the wisdom of Parliament. For eight years of practical work there had been ten years of previous consideration. The approaches to Westminster, begun at the very beginning of the last century by the removal of King's Gate, progressed about the year 1750; one hundred and seven years after, hopes were raised that the slow march of amendment would quicken to a livelier tune. Twenty years have since elapsed, and, in spite of the festive season, the wits of St. Stephen's will neither be merry nor gay; they have bottled up for another explosion, in the Spring, the time-honoured joke of a Select Parliamentary Committee.

THE ECCLESIASTICAL ARCHITECTURE OF RUSSIA IN THREE ERAS.*

II. National Art. A.D. 1475–1689.

In the year 1475, the Czar, Ivan III., invited from Venice the architect Aristotle Fioraventi, for the purpose of erecting various structures projected by him, including the embellishment and fortification of the new capital of Moscow. In the same way as during the Byzantine influence Kief was the centre of the state power, and served as a model for all the towns flourishing at that period, so in the fifteenth century Moscow appears as the capital of the autocractic sovereigns of Russia, and in its turn in its various structures serves as an example for imitation. It must not be supposed that the architects brought over with them and introduced foreign art; on the contrary, at that period Russian architecture had reached a remarkable degree of independence and originality, and if the foreigners did bring with them a knowledge of the styles of the West, the Romanesque and partly Moorish, the national architecture merely made use of them by adapting the same to its requirements, creating quite new and original productions. In the year 1484 began the construction of the brick walls and towers of the Moscow Kremlin; at the same time the foundation was laid by Ivan III. of his new palace on the old spot near the Blagovestchenye (church of the Annunciation). The builder of this structure was Aloyse, from Milan, and of the towers and walls of the Kremlin the Italians, Marco, Antonio, and Petro. The Kremlin of the present day rises in the centre of the town before the traveller in all its quaint originality, and the traveller with aught of the picturesque and antiquarian instincts in him will gaze with wonder not unmixed with admiration at the high stone walls, its curious old towers, and the venerable churches with gilded cupolas. We are indebted to the Italian Petro just named for the Spassky gates of the Kremlin; the tower of these gates, like that of Troitsky gates, carries with it the imprint of the Gothic style, but yet there is a great deal of originality in it. The Spassky gates in particular impress one with their harmonious proportions and lightness, notwithstanding the solidity of their construction; on a rectangular foundation, in the form of a wide square pillar, rises the second story with a row of large and small arches, and a most beautifully-pierced attic, the third story, by its transparency quite smooths off the lines to the steeple. In completion of the composition on the front of the foundation tower is placed a semi-Gothic arch, resting upon two Corinthian pillars. It is through such an entrance that one passes into the Kremlin. These Kremlin structures look both majestic and graceful at the same time. In order to get this impression it is necessary to view them at a distance; it will then be clear what beautiful configurations are hidden in these, to all appearance, heavy forms. The most prominent feature in Byzantine architecture is naturally the dome, and it is to the dome that the Russo-Byzantine has devoted itself in particular. The dome in Classical architecture did not play any important part; a purely hemispherical form of dome carries with it the impress of deadness, and the ancients understood this. The East produced the dome, cherished it, and developed its form in a variety of ways, and handed it over to the West during the Renaissance period, as an element fully elaborated. The Byzantine architecture, sooner than any of the European styles, adopted the dome as a necessary and convenient covering for the transept, but at that period the dome was developed but feebly, and presented the shape of a convex and round vault, rather than an independent form. In this form it came over to Russia at the beginning of its first epoch. We

* See p. 1215, *ante*.

have seen that already in the first Russian churches the number of domes visibly increase, although the dome itself still remains of insignificant proportions. In the Ouspensky and Archangelsky Cathedrals we find the domes already larger than those of Kief and Novgorod. In the sixteenth century Russia came into close contact with Eastern nations, and it is probably owing to this influence that she assumes a new character in her church architecture. In the beginning, the greatest diameter of the dome is at its base; in the course of time this diameter begins to rise further upwards, and, as it were, separating itself from its base by a narrow cylinder; it is in this form that we find the domes on the Kremlin churches; afterwards the diameter continues to rise gradually upwards, the summit of the dome becomes pointed, and the cylinder below the great diameter becomes narrower, in consequence of which we get the shape of an inverted pear. It is this kind of dome that characterises the Byzanto-National style. And thus the domes of the Kremlin cathedrals are considerably lighter and more graceful than those of the first epoch, the drums which support them are of considerable size, and are pierced with long narrow window openings at great intervals. The plans of the structures, the walls, as well as the apses and porticoes, remain the same, but the top part of the walls undergoes a considerable change; along them appear a row of architectural arcs or semicircles, the inside of which is ornamented with rosettes, frescoes, &c. In the Mikhailovsky Cathedral these new decorations are very clearly and distinctly defined; but with this small alteration of the exterior, the church inside experiences a considerable change,—marbles, gilding, sparkling mosaics, and Greek and Byzantine columns disappear, the pillars become round, and both these and the walls are covered with paintings of religious subjects in the most rigid style. The windows become still narrower, and are enclosed with iron bars, and in the church reigns a heavy semi-darkness. The ikonostas of several tiers occupies the principal face in the interior of the church, and quite conceals the altar. All the exterior decorations, the former fantastic forms, which were frequently very light, become low, broad, and heavy. In everything is felt a kind of oppression. The Ouspensky Cathedral was built in 1473, in the time of the metropolitan Philip, but was in the following year destroyed by an earthquake. It was rebuilt by Aristotle, between 1475 and 1479. This church soon became the last resting-place of the Czars, and the tombs of the ancient Czars and grand princes increase still more its sombre, dismal, and austere character. The valuable ikonostas of the cathedral in its pictorial illustrations is supposed to represent the idea of the universal Church, the union of the Old and New Testaments. The Archangelsky or Archangel Cathedral, as it is seen at present, is surmounted with five domes, the height from the top of the middle dome to the floor being 112 ft.; the length, without reckoning the walls is 224 ft.; and the width 140 ft. It was originally built in the time of the Grand Prince Ioann Danilovich, in 1333; it was subsequently, owing to the want of room, replaced by a new church, the foundation of which was laid by order of Ioann Vassilyevich, in 1505. The construction of the cathedral of Michael the Archangel was entrusted to Aloyse, from Milan. We will now call the attention of the reader to one of the most original structures of the Russian Empire. We allude to the Cathedral of Vassily Blazhenny (St. Basile the Blessed), at Moscow. This edifice has attracted the attention of foreigners, who, not being acquainted with the religious habits and customs of the Russian people, as expressed in her ecclesiastical architecture, are unable to understand its importance. Some call this production barbarous, others quaint or grotesque, and others, again, look upon it as the most fantastic architectural production that ever emanated from the human brain. An eminent Russian writer on ecclesiastical archæology gives the following description of this extraordinary production of Russian art.:—

"The Cathedral of Vassili Blazhenny stands on the Krasony *place*, an expensive area, its eastern side facing the Gastiny Dvor or market; its western the Spassky gates; its northern the Voskresensky and Iversky gates; all leading into the Kremlin; the south faces the descent to the Varvarefka-street. The edifice, situated at the end of the *place*, stands alone. If we look at it from the north side from the side of this place, and, besides, at a distance, we find it presents the form of an irregular group, or, as it were, an aggregation of several churches; but the nearer we come to it the more distinctly appears to us its composition. We have before us a pyramid composed of nine obelisks placed on a quadrangular foundation, somewhat irregular on account of the various additions. If we take away these additions we have the plan of a quadrangle, on each side of which are placed the octagonal basements of four towers out of nine forming the entire structure; the three sides out of eight of these towers project out of the square of the foundation. We have to examine the basement of the edifice, or the body of the church, and the nine towers erected on it. The middle tower is the highest of all, the four next ones reach to about two-thirds of its height, the four smaller ones reach to one-half. This is where we get the impression of a pyramid. The walls of the body or basement of the structure are divided along the whole of their extent by a cornice which runs round the whole of the structure. The lower parts of the walls below this cornice are decorated with small pillars, between which are wide architectural squares, some of which are pierced with small narrow windows. Above the cornice is a row of squares, one-third the size of the above, so that for one lower square there are three upper ones. The smaller squares are ornamented with designs of flowers. Above the small squares are arranged semicircular windows in the form of arches, the number of which correspond with those of the small squares below; a row of these windows goes round the whole of the building, just under the roof. In some parts the windows are increased to the size of three. The roof was formerly of tiles, around which ran an inscription stating the year of its construction and the object with which it was erected. Since 1772 the roof has been replaced by one of sheet iron. We come now to the towers, or the upper and most imposing part of the building, as the basement forms scarcely one-sixth of the total height. The middle tower, the highest one of all, at one-third of its height is decorated with prominent massive cornices; it is exceedingly complicated, and rests on a row of ornamental brackets. The part of the tower above the cornice presents the following features: at the corners of the octagonal body of the tower columns are placed, the lower part of them is plain; two-thirds of their surface have an increased thickness in the form of three bands. Where these bands terminate a small cornice goes round the building.

Below the cornice on each side there are three niches, with small windows, and the same number of niches above the cornice; but the latter are twice the height of the former, with windows in each alternate one, but of the full size of the niche. All these parts are notably in the Gothic style and the details, of great delicacy in the decorations of the window copings, are something after the style of the Renaissance. But for that above the grand cornice, the Byzantine style developes itself in all its splendour. We referred above to the architectural arcs or semicircles on the top edges of the outer walls of the Kremlin cathedral. Above the grand cornice are formed three rows of gigantic architectural semicircles, and between these (at the corners of the octagon) three rows of smaller ones. And now imagine that from this zone of Byzantine arcs rises all at once a Gothic tower, and besides, with receding cornices (the transverse section of it being a star with eight rays) and with a tall Gothic steeple, on the apex of which is placed a purely Byzantine cupola, with its cross and chains. Although all this may be termed architectural daring, still for all that the impression it produces is of the most fascinating kind. The base of the steeple is surrounded by semicircles arranged in groups of six in a pyramidal form; this combination is much appreciated in our architecture, and it can be found in the buildings in the Byzantine style of the present day. The four towers which are placed inside of the four façades differ from each other in their details, but their chief characteristics are common to all of them. The cupolas with their drums are placed on high octagonal basements or towers, and the latter are decorated like the grand tower with semicircles, cornices, and flat ornamentations. The four smaller towers are decorated in the same manner. The latter are of high development, *i.e.*, the greatest diameter is far from the base, and the apex is drawn out. They are covered with sheet-iron, and are painted in variegated colours. The exterior finish of each cupola varies in design: on the western one it consists of diamond-shaped projections, placed close together; on the north-west one it is a network, in the meshes of which are arranged the same kind of diamond-shaped projections; on the northern cupola, the form is that of the runners of the melon curled into spiral forms. Around the base of each cupola is a band in imitation of lacework. The sombre interior of the Cathedral of Vassili Blazhenny is formed of eleven chapels and about the same number of sacristies, dwelling-rooms for the church servants. All these chambers are arranged in two stories, and are joined together by a multitude of corridors, cross passages, &c.

The walls are decorated with holy pictures,—some of them very ancient, others recently restored. The name of the architect is unknown. It is said that the builder in erecting this edifice had in view to bring together the styles of every age and every nation,—according to the words of the Testament,—'Let there be one flock and one shepherd.' The cathedral was built in 1558, in the reign of John the Terrible, who, on the conquest of Kazan, made a vow to erect a church. It suffered considerably during Napoleon's occupation of Moscow in 1812. As to the merits of this marvellous piece of architecture, it is necessary only to look at the designs of ancient Russian structures and the structures in the Byzantine style of the present day, and then examine the cathedral we are describing. There is not a single detail, or line, or method of execution in our national architecture which is not to be found in the cathedral of Vassili Blazhenny. We do not, however, wish to imply that this cathedral created a national architecture,—that it represents its final type,—no; but it has reproduced nearly the whole of it, and in this respect that architectural monument is invaluable, nor can there be denied to the architect genius in the composition. In this cathedral the national art has been fully expressed. After the Polish invasion and the interregnum, the house of Romanoff came to the throne, and upon the establishment of order the national art was again revived. In order to study the architecture of that period it is necessary to refer to the Imperial slobadas (large villages) of Mikhalofsky and Kolomensky and the Novodevitchye Monastery; but the architectural art produced nothing particularly novel, only the old heavy forms became lighter, the details showed more regularity in the pillars and archivolts; but, on the other hand, the ancient Byzantine style of the first period disappears. In restoring the ancient temples the narrow windows became widened, forgetting the necessity for semi-gloom, the walls were strengthened with buttresses, and in the fresco and oil paintings they held blindly to tradition without having caught the merits of the ancient style. Civil architecture began to develop itself to the detriment of church architecture, although the former for the want of elements could not boast of richness of composition, but for these the minutiæ were cultivated in the extreme. As an example may be taken the palace in the village of Kolomenskoye, where Peter the Great was born, who ascended the throne in 1689, and who, by the reviving of the national spirit, gave to architecture, as to everything else, a new direction."

OUR COLONIAL PROGRESS.

The "Statistical Abstract" for the colonial and other possessions of the United Kingdom has just been issued, and it contains a mass of facts showing the material progress of many of our colonies in recent years, and the tables are from authentic sources in regard to the population, expenditure, debt, shipping, trade, banks, railways, agriculture, &c. It may be interesting to summarise some of the facts given in a bulky Blue-book, for many of them have an important bearing upon home interests. The population returns are not generally complete, but those for Australia show that there has been a great growth in the population between the years 1871 and 1875, the numbers having risen to 2,327,882 in the latter year, the increase being especially noticeable in Victoria, South Australia, New Zealand, and Queensland. In regard to revenue, the figures are very much fuller. In India the revenue, slightly over 50,500,000*l.*, has been comparatively stationary of recent years; Ceylon, which had fallen, is now beginning again to rise; at the Mauritius it fluctuates under and over 700,000*l.*; in Labuan it is slowly rising, and has now reached 8,758*l.*; whilst in Hong Kong it has risen irregularly, and is now

186,818*l.* In Australia the increase has been large within the last fifteen years. In 1861, the gross amount of public revenue in New South Wales was 1,843,067*l.*, and it increased to 4,121,996*l.* in 1875; between the same years the revenue of Victoria rose from 2,952,101*l.* to 4,236,423*l.*; of South Australia, from 575,575*l.* to 1,143,312*l.*; of Western Australia, from 67,261*l.* to 157,775*l.*; of Tasmania, from 315,733*l.* to 343,676*l.*; of New Zealand, from 782,022*l.* to 2,813,928*l.*; and of Queensland from 238,239*l.* to 1,261,464*l.*; so that the increase in Australia has been in the total from 6,773,998*l.* to 14,078,574*l.* The revenue of the Falkland Islands has fallen off, and is little more than 4,000*l.*; that of Natal is now over a quarter of a million, and has been doubled in fifteen years, whilst, in that period, that of the Cape of Good Hope has increased from 748,832*l.* to 2,246,179*l.* The Gold Coast, Sierra Leone, Gambia, Bermuda, and Honduras, have also increased; but their amounts are comparatively small. The Dominion of Canada has increased its revenue from 2,851,652*l.* in 1868 to 5,135,149*l.*; Jamaica, having doubled its revenue of 1861, has now over half a million; and Trinidad has also considerably enlarged its receipts. The public debts have been considerably enlarged,—India, to 130,493,284*l.*; the total of Australia to 54,759,347*l.*, of which New Zealand, Victoria, and New South Wales have the largest parts; the Dominion of Canada to 24,168,412*l.*; the West-India Islands to 1,069,502*l.*; and other of the smaller possessions to proportionate amounts.

As regards foreign trade, it may be said that the tonnage of vessels entered and cleared has been considerably added to as regards India; for the Dominion of Canada, it has doubled; and for Australia, it has nearly trebled in fifteen years; whilst of the smaller possessions Jamaica affords perhaps the most satisfactory enlargement of this portion of its trade, the tonnage having increased from 197,376 in 1861 to 766,378 in 1875. The value of the total imports is next given; and of these it may be said that India has added ten millions sterling to the value of her imports in fifteen years, the value now being given as 44,363,160*l.*; Australia has nearly doubled hers, and has now a value of 47,272,839*l.*; the Dominion of Canada has now a total of 25,639,642*l.*; and Malta, one of 10,324,587*l.* The imports from the United Kingdom (included in the sums just stated) were 34,246,716*l.* for India; 23,320,674*l.* for Australia; and 12,572,306*l.* for the Dominion of Canada. The exports have also risen:—India, to 57,984,549*l.*; Australia, to 44,407,000*l.*; and Canada, to 16,226,454*l.*; and about half in each case is sent to the United Kingdom. In regard to some of the chief of these exports, the wool sent out of Australia is now fourfold what it was in 1861, and nearly double in respect of the Cape of Good Hope, whilst Natal has grown to be a considerable shipper. As regards the general class of imports, India is especially increasing her imports of metals, and her exports of rice and tea; Ceylon, her imports of cotton manufactures, and her exports of coffee; Australia has a large and general increase of imports, but her gold exports do not keep pace with the progress of some other of her productions. The rise of the preserved meat trade is noticeable in Queensland; the enlargement of the wool trade in Natal, and the export of copper ore from the Cape of Good Hope; whilst Canada has especially developed her provision export trades.

The acreage of land under wheat is very largely increasing in the Australian Colonies, for whereas it was 747,927 acres in 1861, it was 1,513,419 in 1875; the number of horses in those colonies has also been doubled in the same period; there has been a large increase in the number of horned cattle, and the number of sheep is nearly trebled, whilst the possibilities of bacon are enlarged by almost a duplication of the number of pigs. Coming now in turn to the vital statistics, we find that the gross number of births in the Australian colonies is much enlarged, but the proportion to estimated population is less, it having fallen from 41 per 1,000 in 1861 to 36 in 1875, and varying in the latter year from 29 in Western Australia to 40 in New Zealand. The deaths are doubled in the interval in actual number; and the proportionate number has risen from 16 per 1,000 of the population to 19,—the highest in the parts giving this total being 24 for Queensland, and the lowest 18 for New South Wales and Western Australia. The marriages, it may be noticed, are increased in number, but not in proportion, the general average having fallen from 9 to 7 per 1,000 of the population. The lowest ratio is that of Victoria, and the highest place is jointly occupied by New Zealand and Queensland. The banking statistics cannot be very well tabulated, but generally they show an increase. Those relating to railways may be thus stated:—British India has increased the number of miles open for traffic from 4,832 to 6,497 in five years; Ceylon, in one year less, from 74 to 91; Mauritius, in both years' returns, 66 miles. In Australia, New South Wales had, at the earlier year, 335 miles, and had at the later, 347; Victoria, which had 276, raised that amount to 617; South Australia, from 133, has become the possessor of 274 (inclusive of certain horse railways); Western Australia has now 38 miles of railway open for traffic; Tasmania, 150; New Zealand, 542; and Queensland, 265. Natal has now 5 open miles; Cape of Good Hope, 149 miles; the dominion of Canada, 4,443; Jamaica, 25; and British Guiana, 21 miles. There is thus, broadly looked at, a vast increase in the material prosperity of our colonies; a large development of their resources; and a very great extension of their trade. We share to a large extent in the fruits of these; and we partake to the full in the benefit of their enlarged trade, for the bulk of their exports are sent to us, and the bulk of their imports are delivered from us. We may, therefore, fittingly rejoice in their prosperity, and look to the future to increase its ratio, with the confident hope that we shall continue to preserve and extend our trading connexion with them; for from us they receive yearly accessions to their sinew and strength; yearly their indebtedness to us in monetary matters increases; and yearly the bonds of sympathy and of trade should be strengthened.

THE TELEGRAPH IN GERMANY.

WE took occasion in a former number * to refer to the underground cable laid last year by the German Telegraph Department between Berlin and Halle, as the first of its kind. Since then the principal German telegraph lines have been changed on this principle, while others are in contemplation, so that, within the next few years, Germany will be covered by a network of underground cables. The highly-important route from Berlin to Mainz was completed this summer. And now, another line, of great strategical importance, has just been opened. We refer to the underground cable now connecting Berlin with Hamburg, the principal emporium in Germany, and Kiel, her great naval station. A similar attempt for at least part of this distance had already been made by the whilom Danish government, as early as 1852–53, when it carried out the experiment, at that time considered bold, of having an underground cable laid between the towns of Altona, Neumünster, Rendsburg, and Flensburg. Though the laying-down of the cable was successfully accomplished, its faulty construction, owing to the then yet imperfect state of telegraph engineering, carried with it ultimate and certain failure. In laying the present German cable, the route of the former Danish one was followed, unintentionally, for some distance, when fragments were discovered, of great interest to the telegraph engineer. The former Danish cable consisted of a single copper wire surrounded by an isolating gutta-percha coating, this again being enclosed in a covering of lead, to protect it from injury. Unfortunately, it was soon found that its isolation was most imperfect. Investigations showed that the coating of lead, where the cable had been laid in marshy soil, which is rich in carbonic acid, had been gradually destroyed by the formation of salts of lead, in consequence of which the gutta-percha was brought into immediate contact with the decomposing substances of the soil, deformed, rendered friable, and finally its property of isolation entirely annihilated. But since that time telegraph engineering and cable manufacture have undergone a complete revolution. Cables are now constructed and laid down which, as far as scientific and technical suppositions go, will last, if not for ever, at least for generations.

The underground cable just opened between Berlin and Kiel consists of seven separate copper plaits, separated from each other by a gutta-percha coating, each plait or cord representing a twist of seven single copper wires. The seven copper plaits are formed into a cylindrical rope by means of intertwisted skeins of hemp and a covering of tarred hempen bands, and again protected against external violence by galvanised iron wires twisted round it. This covering of iron wire, finally, is made secure by specially prepared jute spun round it. This description of cable is the first of its kind every single part of which is made in Germany. Dr. Werner Siemens has specially established cable works at Charlottenburg, where every branch of the manufacture of cables, even to the covering of the copper plaits with gutta-percha, is carried on. Regarding the cost of the work, a kilomètre of the deposited cable comes to about 4,500 marks (225*l.*), the whole cable (400 kilomètres long) to 1,800,000 marks (90,000*l.*), or about 360*l.* per English mile.

The cable was formally opened on November 3, at Kiel, in the presence of the German Postmaster-General and a large assemblage, including a number of telegraph engineers and scientific men invited by Dr. Siemens; representatives of the Austrian and English Telegraph Departments being also present. The first messages sent through the cable were addressed to the Emperor William, the Crown Prince of Germany, and Prince Bismarck. Upon this followed highly interesting experiments with Professor Hughes's printing apparatus on the line from Kiel to Berlin, which were entirely satisfactory. Next, trials were made with Dr. Siemens's lamp-black apparatus (already tried on the Transatlantic lines), and Hefener Alteneck's box apparatus. The aim of these novel apparatuses is to work at long distances, with proportionately weak currents and without transfer gear, direct upon the cable lines. Both apparatuses are based upon the Morse principle; but while in the Morse apparatus the type, consisting of strokes and dots, appears in a straight line moving in the middle of the strip, in the new apparatus the system has so far been changed that the Morse signs are produced only in the form of dots, which are placed by the apparatus upon the strip of paper in two parallel rows, separated from each other. With the lamp-black writer the telegraph signs are scratched by a fine point upon a strip of paper to which a coat of lampblack has been applied, and fixed at once by means of alcohol and shellac. The movement of the point is effected by the sliding up and down of a small wire roll, or induction spiral, situated in a hollow magnet. The type produced appears in curve-like dents, similar to graphic representations; the lower points of these dents representing the strokes, the upper points the dots of the ordinary Morse type. With the box apparatus, the Morse type appears upon the receiver in dots, produced partly upon the lower part of the strip of paper, partly upon the upper; the lower points represent the Morse strokes, the upper ones the Morse dots. Messages were sent by means of the lampblack apparatus and box writer, without transmission, upon the cable Kiel-Berlin-Frankfurt, 597 miles, without any disturbance, to the great satisfaction of all present.

* See *Builder* for April 8, 1876.

A NEW CLASS OF WORKMEN.

So much has been said of late about the workman,—using that word in its ordinary acceptation,—that it would seem, at first sight, all but impossible to add more either of novelty or of real importance. But it is far otherwise when we come to analyse the matter, and to look with open eyesight at what is going on all round us, and in special localities every here and there. And more even than this when we come to inquire into the peculiar vocation and mode of work of the workman of past days, and to compare the work then done by him with the work as now turned out of hand by his successor in labour's field,—the modern workman of to-day. It is an important subject of art-thought, not only to society at large, who get the ultimate benefit of a true action, but to those who rule in art; and certainly, if not to these, to the artist who in great measure directs the workman's hand. We are more particularly concerned with those men who are employed in building operations, as stonemasons and stone-carvers, and who so fully exemplify the vocation of the workman, and whose peculiar position at the present moment is causing some anxiety, from the fact of his being here in London brought face to face with foreign competitors.

There is perhaps no more interesting fact in the whole subject of architecture, or in its mode of production and "development," to borrow a convenient and descriptive word, than the special part played by the workman necessarily

in it. Architecture is a Fine Art, fully as much so as sculpture or painting, or music. But in neither of these has the assistant workman so large a part, if, indeed, he has any part legitimately to play in them. Without the workman architecture could not exist, except on paper, so that in this art he is a necessary element, fully as much so, each man in his way, as the architect-designer himself. It depends upon the workman as to how nearly and correctly the work, as it is marked out for him, is brought into form, and the art-thought is realised in material. No matter, indeed, how original or clever the thought, or how accurate and constant the guidance may be, if the executant workman be deficient in skill, or even deficient in appreciative apprehension. It is curious to think of how much he does, and of how much of the final impression made when the structure is finished, depends on the executive power and skill of the workmen who have been employed on it. Trite as the subject may seem, it is in these days all but a new one. Of its import in art no one doubts.

Now, what is a workman? As commonly understood, he is a simple working-man, with a fixed and cut-out task before him, with weekly, or as now, hourly, wages, but having really, as in the instance of the stonemasons, no individual power or art capacity of his own as an artist, still less personality. All are levelled to a sort of mean, and when one man is taken from a certain work, another is at once, and, as a matter of course, put into his place, and goes on with the work. No one, of course, disputes this, as it is the all-but-universal custom, and, indeed, is the main source of the strength of a manufacturing country and age like ours of the present time. That it has its strength there can be no doubt, and out of it, as a system, very great and rapid powers of production necessarily arise; and the quantity of work produced must be far in excess of what would, or perhaps could, otherwise be. Man is brought to a machine level, and he works with all the speed and regularity, and, indeed, accuracy, of machinery, and the world in these days is in rapid course of being covered with the results of this all-potent process. The modern working-man may be compared to a modern soldier. The modern soldier forms part of a huge machine, and fights by rule and method.

But may we not usefully contrast this modern mode of work with that which obtained in the Middle Ages, and during the time, to confine ourselves to that, between the rise of the Romanesque, or "Norman," to the end of the "Perpendicular" Gothic? It is curious to note, in passing, how little the subject of the actual production, or the working out, of the Gothic architecture, from first to last, has been thought of, or has engaged the attention of those who have written so much and so fully about it. And how much of it, and in it, it owes to the workman, putting design for the moment out of the question! If the Gothic buildings of the past be, indeed, famous in these modern days as successive feats of inventive and designing skill, then certainly are their details not a wit less noteworthy and wonderful, and right full of inventive thought, and sentiment, and feeling! It is unnecessary, indeed, to search for special proofs of this, for they are everywhere to be found where the work has been left to show itself, and where "restoration" has not destroyed the vital force and energy. But wherever it is, and of whatever date, one thing has always seemed to our mind to be visibly impressed on it, and to be evidenced by it, *i.e.*, the power of the workman not only to execute but to think, and to embody his thoughts in the material he worked in. Do our modern workmen here do this? Will their German successors do so? If so, in what way?

There are, indeed, many points of difference between the workmen of the Middle Ages, still to confine our thoughts to them, and our present race of workers. The Gothic workman, for example, never copied either his own work or that of the times which preceded him. If there be an example of copied Gothic it must be an exception, and must have come of some peculiar and special accident of the moment. All our Gothic detail is, as all know, and, indeed, are proud to own, if well done, copied from the past of Gothic. The forms of the old and past are reverted to always, and are imitated as nearly as they can be, put into new and, may be, unusual and novel positions, but are copied forms, and do not for a moment pretend to originality. Invention is out of the question. We really cannot even imagine the mental state of the workmen of the twelfth, or thirteenth, or fourteenth, or fifteenth century; so totally unlike is our *modus operandi* to theirs. It is impossible to cite a better example than the capitals of the famous Doge's Palace, of which details may be seen in the Architectural Museum. The mind and thought of the actual workman is there visible, as well as his handwork. Each cap is a study in itself! All are original and uncopied.

And then, again, what was the workman himself *expected* to do? How did he know what was wanted of him, and whence did he get his "details," to use that convenient word? Did he get them from drawings, or had he anything in his head, and at his finger-ends, to work from, and so needed only to be told to get to work? As we cannot but think, after long study of the matter, he must needs have been an artist as well as a workman, and that he must have had the capacity in himself individually to fill up, so to phrase it, the outline drawn by the master-architect of the structure as a whole. Indeed, to speak generally, must there not have been in the antique Greek and in the old Gothic days a class of men sufficiently educated to think out and fully made capable to work out such work,—*thinkers* and *artists*, as well as *workmen?* And is there not here a hint for the future of art, and in these days, now that we are importing systematically workmen from other countries and other nationalities, with, it may be supposed, distinct and national feeling and powers, and with capacities to mould material into forms peculiar and special to themselves? The Gothic of England in the Middle Ages, and the Gothic of Germany, are seen now to have been all but as two different styles of art.

It is impossible thus to glance back and to look attentively at what has been done in Gothic days, when the style was indigenous, and the artistic expression of the day, without a more and more intense longing to know how such work was done, and the position and special power of the *executive* workman. It is impossible to look at the Venetian capitals without at least a dim view of a Phidias, in a certain quaint way, and of his own time, at work on them. It is surely just such men as these that are now wanted. In the work at the new Law Courts what would such not have done? A new order of workmen, with special knowledge and powers, may be for a long time a dream, it is true; but the day will come when the necessity for such will become evident. We do not here intend altogether "figure" cutting, as it is termed, or subjects; but even common masons' work, without more to illustrate it or to explain it than the plain stone itself, as in the Greek work, where all alike is wonderful, or, indeed, at what has always seemed to us really artistic work,—the *rubble* walling of the Middle Ages. As to the Gothic walling of the castles and gateways, a glance at the Tower, or Windsor Castle, or Dover Castle, or at the dull wall which shuts in the school-house at Westminster, will evidence its artistic merit and its difficulty.

THE GENERAL CUSTOM-HOUSE, PEST.

In addition to the increasing commerce which has raised the importance of Pest considerably, there has, within comparatively recent times, been another great factor at work in advancing its progress—the fact, namely, that Hungary received back her constitution, which signal event made Buda-Pest the seat of an independent government. By this change Pest also became the centre of numerous enterprises, such as railway companies, and the necessity arose at once for a number of buildings for offices, termini, and residences for persons there engaged. A feverish activity of building operations set in, especially in the localities situated closer to the banks of the Danube, but more in a western than an eastern direction, which development has since been continued. But this want, far from being at once satisfied, in conjunction with the facility given by the tramways branching in all directions, caused building operations to extend gradually also in other quarters than those which were first selected.

This development of Pest in all directions was very much favoured by the Government, as the new Ringstrasse, an imitation of that of Vienna, the erection of new bridges, a junction railway between Buda and Pest, and other public works, amply prove. The future configuration of Pest, thus indicated by these new works, must be kept in view if we are not to come to the conclusion that the General Custom-house (of which we give an illustration in this number) is not built in a wrong position. This building is, judging by present circumstances, placed somewhat far from the centre of the city, on the lower bank of the Danube at Pest, being distant three-quarters of an hour from the chain bridge connecting Buda with Pest, and perhaps an hour and a half from the central station of the State Railway, and at greater or less distances from all the more important merchants' offices. But another view will prevail as to the best position of the new Custom-house when it is considered that it is connected, or will be connected, with all the termini of Buda-Pest by the junction-railway above mentioned.

The plans for the new General Custom-house were designed by the architect Nikolaus Ybl. The great building was erected principally as a central depôt for all goods coming from abroad destined for the custom-houses of Buda-Pest and the surrounding districts. Only the part towards the back of the river façade will be used for other Government offices. The building, besides its many offices and numerous and spacious warehouses, to which two large courts, covered with glass roofs, belong, contains room for but four family residences.

The building is 468 ft. long and 168 ft. deep. Its cost, *circa* two million florins (200,000*l.*), is not too high when it is considered that the expense for the masons' work and iron work alone is 700,000 florins (70,000*l.*), and that the work of foundation was very expensive on account of the close proximity of the Danube, it having been found necessary to construct a layer of concrete 4 ft. 3 in. thick. But this foundation has likewise made it perfectly safe against the irruption of water. As regards its inner arrangement, it may be remarked that the warehouses may be entered direct from the water-side by tunnels and tramways. Those tunnels are provided with sluice-gates in case of an excessive rise of the river.

Pest has acquired by its General Custom-house not only a handsome edifice, but a new lever for its material progress.

THE HOUSES OF PARLIAMENT, VIENNA.

New Houses of Parliament were not included among the public buildings enumerated in the autograph letter of Francis Joseph, addressed to the Minister Bach, respecting the extension of Vienna, and which were to rise upon the space acquired by the demolition of its fortifications. Only three years later the idea gained ground that a legislative assembly would not shake the foundations of the State, but would rather help to secure them. The building, consequently, has not such a long preliminary history as its *vis-à-vis*, the University. But it is long enough since Minister Schmerling, amid the cheers of the Chamber of Deputies, announced that he was going to ask for funds to build new Houses of Parliament. In the temporary building which was put up in a few weeks in the spring of 1861, constitutionalism felt still only like a makeshift, which was to be discarded as soon as it had served its end. The erection of a palace for the representatives of the people that was to last, and was at the same time to be worthy its purpose, only seemed to confirm the recognition of the new system. But much water was first to flow down the Danube, the constitution was to be suspended, revived, and revised, almost for the second time suspended, dualism and Parliamentary Government were to be established—all things which never entered into the head of Herr von Schmerling—before the construction was commenced in earnest.

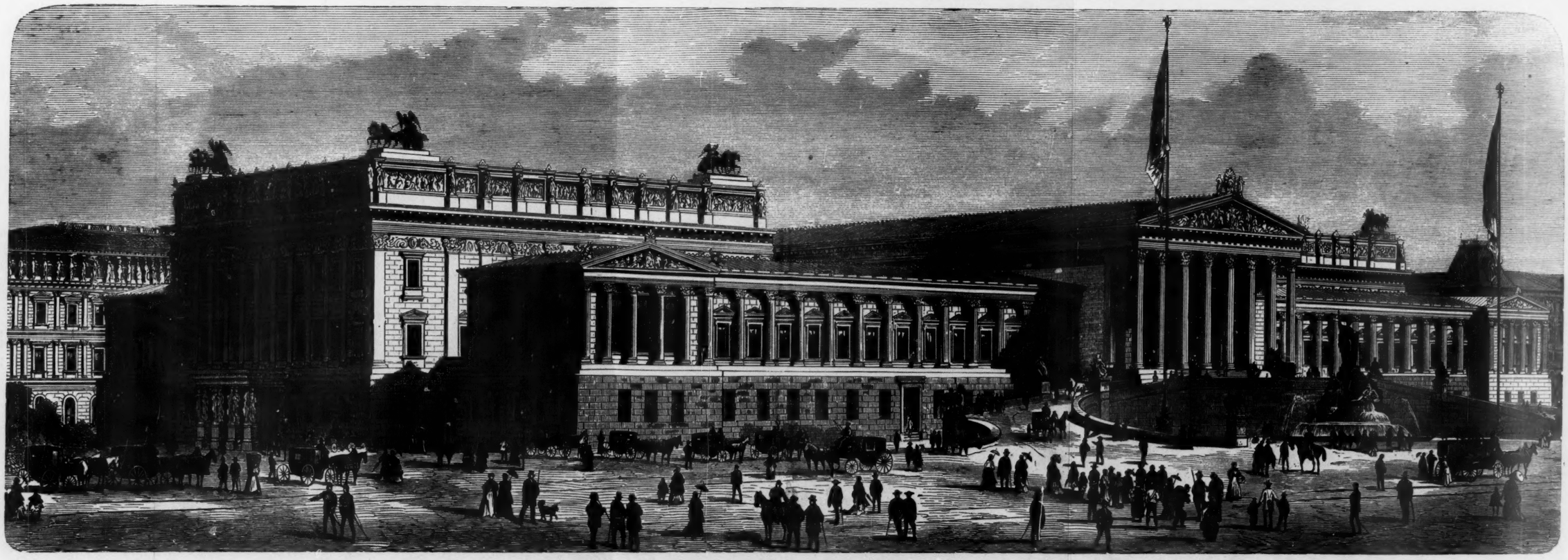
The Houses of Parliament are placed at the south-east side of the former Paradeplatz, and flank the new Town-hall. Theophil von Hansen, a master of Greek architecture, found here, in his second home, for the first time an opportunity for displaying his undoubted ability. Hansen is a Dane by birth, resident in Vienna for twenty-eight years, and has had, consequently, to pass through the troublous times during which there was as good as no employment for architects; the work which he executed later being either outside his sphere or not of a striking description. His greatest creation, which is now illustrated in this journal, speaks for itself.

The two Austrian Houses of Parliament are here united under one roof: for each of them a large hall for sittings is appropriated. Round

THE GENERAL CUSTOM-HOUSE, PEST.—HERR NIK

THE HOUSES OF PARLIAMENT, VIENNA.—HERR THEOPH

THE GENERAL CUSTOM-HOUSE, PEST.—HERR NIKOLAUS YBL, ARCHITECT.



THE HOUSES OF PARLIAMENT, VIENNA.—HERR THEOPHIL VON HANSEN, ARCHITECT.

them are grouped a great number of meeting and committee rooms, offices, &c. The architect consequently had to design a double building, the two principal parts of which are shown in the profile, and which are separated, and at the same time united, by such spaces as are used by the two legislatures in common. This central neutral or common part impresses upon the building its principal character. Towards the Ringstrasse, which latter has repeatedly been styled the cestus of Vindobana, a nobly proportioned portico opens, the approach to it forming a gently ascending ramp. The portico opens into a large vestibule, and this again into a spacious hall, which latter is to serve as the future Valhalla of Austria, where statues of her more eminent citizens are to find a worthy place. The centre part, besides, contains the rooms for the ministry, the presidents of both houses, and their offices; as well as the short-hand writers' rooms and refreshment rooms. To the right and left of the great hall the lords and deputies turn to their respective "houses," their committee and lounging rooms. The entrances for the court on the one side and for the public on the other are entirely separated from the members' entrance. Generally speaking, there is no want of means of communication, lobbies, and stairs. Thus the vestibule of the ground-story may be entered also from below the approach, handsome staircases leading into the upper vestibule. The rows of seats for the members of both houses, rising as in an amphitheatre, are surrounded by special lobbies, in order to enable deputies to noiselessly communicate with each other, outside the house, the lobbies being connected by many doors with the latter.

The great halls for the sittings of the two houses are situated back to back, *i.e.*, the seats of the presidents are towards the centre, those of the members at the outside. This arrangement enables the two presidents to communicate with each other by the shortest way; at the same time the members are able to enter the different meeting and consulting rooms direct from the house, while both "lords" and "commons" have equally far to go to reach the spaces for their common use. Thus the entrances to the galleries, and again the latter, are completely separated from the interior localities serving especially for the two "houses." A statue of Austria, as patroness of the house, is to be erected in front. Herr von Hansen expects that the sister arts will have a full share in rendering the Austrian Capitol a place of dignified greatness.

ARCHITECTURAL NOTES ON ST. ALBAN'S ABBEY.*

The Norman Church.—Tradition relates that, about A.D. 303, a man named Alban was beheaded on a gently-sloping hill outside the city walls of the ancient Verulam. Also, that the early Christians built a church upon the spot of the martyrdom; but nothing of importance is recorded until Offa II., king of the Mercians, founded a monastery there in honour of St. Alban, about the year 793. He placed the monastery under the rule of St. Benedict. Between the time of its foundation by Offa and the invasion by the Normans, this monastery was governed by thirteen successive abbots. The rebuilding of the early church, which had been contemplated for many years, was delayed until William the Conqueror, in 1077, appointed Paul of Caen to the abbacy. Abbot Paul was a relative of Lanfranc, Archbishop of Canterbury, who was abbot at St. Stephen's, of Caen, at the time of its erection in 1064. Lanfranc rebuilt Canterbury almost upon the model of St. Stephen's. Paul, who was simply a monk at St. Stephen's, more ambitious, rebuilt St. Alban's on a similar plan, but on a scale vastly exceeding either Canterbury or St. Stephen's, as the following table will show:—

* From a paper, read before the Royal Institute of British Architects on the 17th inst., by Mr. James Neale, F.S.A., Associate.

Abbot Paul's church consisted of a nave, with its side aisles; transepts, without aisles; choir, with side aisles; sanctuary, with side aisles and apsidal termination. Paul adapted the levels of the floor to the levels of the site. The floor at the east end seems to have been about 6 in. above the ground-line adjoining, and the floor at the west end about the same amount. The slope of the hill downwards from the east thus allowed a difference of 4 ft. in the floor levels. But he was not contented with this: the slope from the north, southward, was also echoed; the floor is thus 2 ft. 6 in. lower at the south than at the north wall of the transepts. These floor-levels have been frequently modified, but their influence has been considerable on the fate of the building. One of the constant aims from the thirteenth century onwards was here, as elsewhere, to increase the prominence of the high altar. It was ultimately elevated 3 ft. 6 in. above its original level; but the Norman levels in the sanctuary aisles have probably always been maintained, and they dictated the floor-levels of that great extension of the eastern arm which occupied the century in which Mediæval art was attaining, and attained, its greatest excellence. A sufficient elevation was attained for the high altar without the necessity of a crypt, which so frequently formed a feature in the design of the earlier churches. The Norman church was built of tiles collected from the ruins of Verulam. Some measure 21 in. by 12 in. by 2½ in., but the average size is 17 in. by 12 in. by 1½ in.; they are of a deep red colour. The mortar-joints in all the Norman work are in some instances thicker, but as a general rule a little thinner than the tiles themselves. The possession of so immense a bulk of ready-made material excluded stone from any considerable portion of the building; a few shafts and a few capitals, and the impost mouldings of the ground-story and triforium arches were, for constructive reasons, made of Barnack stone, but practically the whole of the building was constructed with Roman tiles. Probably the massiveness of walls and piers was to some extent due to the unlimited supply of tiles. "Cushion" capitals occur in the transepts and tower. These may very possibly be the earliest capitals of this form remaining in England. The division of Norman work into earlier and later, by Mr. Edmund Sharpe, the former terminating about the year 1090, would bring the whole of this church within this earlier period, when "cushion" capitals are very rare,—at any rate, if we accept the statement in the "Gesta," that Abbot Paul built the entire church during the first eleven years of his rule; that is from 1077 to 1088.

The Saxon Balusters.—As to the plan, or state of preservation of the early church in 1077, we have no proof; but it is certain it was no mean structure; and the Normans, although erecting an entirely new building for some definite purpose, retained parts of the destroyed one. It is not improbable this might have been done partly to create a kindlier feeling, and obtain more willing assistance from the Saxons. These relics seem to have been arranged with considerable care in the bays of the triforium arcading of the sanctuary and transepts. Those in the sanctuary would be removed when it was partly pulled down and wholly remodelled in the thirteenth century, but those in the transepts still remain. These balusters are complete in themselves, each having a shaft, capital, and base; but in order to lengthen them, the Normans added capitals and bases. These additions contrast with the original columns in workmanship, material, and design. The new capitals and bases were worked with the axe (as was all the other stone throughout the Norman church). The whole of the plain and moulded surfaces of the original balusters are *worked smooth*,—evidently turned in a lathe. Some of the marks of the turning tools are very fresh. It would thus appear that they could never have been used externally in the Saxon church. The rest of the circular shafts (used alternately with the Saxon ones) are of the Norman period, as indicated by the stone and axe marks: they are not turned, but axed vertically. During the late restoration of the Saxon church on the Castle Cliff at Dover, and also that at Jarrow-on-Tyne, a number of these curious balusters, which had also been reused by the later builders, were exposed to view. Some of the moulded bands of the Dover balusters exactly correspond with the St. Alban's mouldings. Those at Jarrow have a multiplicity of mouldings, consisting mainly of *flattened beads*, without the variety of detail found at St. Alban's and Dover. Fragments of similar balusters were recently discovered at Ely Cathedral with mouldings of the same character as those at St. Alban's, and the marks of the turning-tools very clearly visible.

Abbot John De Cella's Work in the Western Porches. — The Norman church retained its original character till Abbot John de Cella (1195–1214) pulled down the west front. In commencing its reconstruction he made his floor-line in the porches about 3 ft. 6 in. lower than the original floor of the nave of the Norman church. This new level also appears in the north and south aisles. It is possible, though one thinks hardly probable, that De Cella,—who seems to have been somewhat venturesome in his undertakings,—may have vaguely contemplated carrying this lower level along the nave some considerable distance further eastward. It is equally possible that he did not intend to carry it further eastward than the eastern portion of the western bay of the nave, rising to the general floor-level by means of a flight of steps. This last has, for some thirty years last past, been believed—without very much foundation—to have been De Cella's intention; a belief that is likely to embody itself in a solid form ere long—with a flight of steps from the north of the north aisle to the south of the south. For my own part, the floor-levels north and south previously mentioned are difficult to forget. There are in them not only materials for conjecture as to De Cella's intentions, but incontestable evidence that the north aisle retained, till the destruction of St. Andrew's Chapel, the floor-line that De Cella had marked out when he started on the western front. For about 70 ft. from the western wall the north aisle must have been reached by a flight of steps on the aisle side of the ground-story piers; whether this lower floor extended further eastward than this new excavations will determine.

Abbot William de Trumpyngtone's Work in the Western Porches.—Abbot Trumpyngtone took the central and southern porches in hand and speedily carried them to completion. All the new mouldings above the capitals of the central porch and nearly the whole of the mouldings of the southern porch have the same character; there are fewer members in the groups, and the mouldings are coarser in themselves than those in the northern porch. There is no *dog-tooth* in either of these porches. The carving in the north porch and the earlier carving in the central porch has peculiar overlapping curling leaves and strongly-defined stems, and is singularly like that in the choir of Lincoln Cathedral. The later carving in this porch and the whole of the carving in the southern porch is the normal Early English foliage. From this it will be seen that the northern and central porches differ largely from the southern porch. In the omission of central bosses from these vaults both differ from the northern porch. There are in the central porch evidences of individual preferences, over and above the evidence of the change in style. As far as was compatible with maintaining the work already erected and carrying it to a logical completion, Trumpyngtone made modifications in the framework of the design that are hardly credible. For instance, De Cella contemplated reproducing the jambs of the central porch on the nave side, with their clustered marble shafts, thus giving it a greater depth and importance than the lateral porches. But Trumpyngtone built in the two doorways between the clustered jambs. The jointing of these doorways does not range with the jointing of the original jambs. In Mediæval work it was not unfrequent for stones already prepared to be used at a later date. This occurs in the central porch at St. Alban's, but with this difference from other instances,—a difference, as far as my observation goes, making the case unique. Trumpyngtone used stonework prepared by De Cella, but cut away the minor mouldings. De Cella had not worked the whole of the vaulting ribs; Trumpyngtone was unwilling to supply what was wanting with copies of De Cella's stonework. He was equally unwilling to throw aside the stonework already prepared; this strange piece of self-assertion is the result.

	St. Stephen's, Caen.	Canterbury.	St. Alban's.
Number of bays in the nave	9	9	13
" " " choir	2 besides the apse	2 besides the apse	5 besides the apse
" " in each transept	2 and 1 apsidal chapel	2 and 1 apsidal chapel	3 and 2 apsidal chapels
Total length from east to west,—about	290 ft.	290 ft.	460 ft.
Total length across the transepts from north to south,—about	145 ft.	145 ft.	189 ft.
Length of nave taken from west front to west face of transept,—about	193 ft.	193 ft.	284 ft.
Length of western façade,—about	90 ft.	90 ft.	possibly about 150 ft.

Judging from the carving and the forms of the mouldings, I think the earlier parts of the porches at St. Alban's are a few years later than the choir of Lincoln, and therefore 1200-1205. In the western porch of Ely Cathedral the general design of the lower wall arcading, and of the clustered jambs, is similar to the central western porch at St. Alban's,—but the less undercut mouldings, the withered crumpled carvings, &c., of the Ely porch point to a later date,—probably about 1225.

The Western Towers.—Cutting down his predecessor's work was rather a custom with Trumpyngtone. The porches might have been sufficient for many men, but in the work of the intended western towers he did something equally vigorous. The archway from the north aisle into the tower was destroyed at the time of the fall of St. Andrew's Chapel, with the exception of a portion of the west jamb. On the south side the arches and jambs are more perfect, and the original design of John de Cella (1195-1214) is there exhibited. In the jamb prepared by De Cella, eight clustered marble shafts were arranged for, and six smaller stone shafts, slightly recessed, in the intervals between these marble shafts. De Cella's design is also traceable up to the level of the marble annulet moulding. At this level he discontinued the work. Trumpyngtone carried up the smaller stone shafts to the capitals, but entirely omitted the marble ones. The dimensions of the western towers can be ascertained from the foundations, and their height when further progress was arrested may be supposed to be shown by the height of the existing work. There is weight in the suggestion of the Rev. H. Fowler, that the western towers would almost certainly have been named in the records if they had ever been complete enough to form part of the floor of the building. In truth, the existence of Norman towers,—now a mere conversational commonplace,—should rest on a more solid foundation than the tile and flint work found under the ground level, which might be of any century.

Trumpyngtone's Work in the Nave.—Messrs. Buckler, in their admirable book, "The Architecture of the Abbey Church of St. Alban," 1848, make a special point of the method of the change from the Norman to the Early English work. They say "the Norman walls were not wholly demolished, but the massive tilework was reduced in sufficient proportion to allow it to be cased with ashlar." It is also added that the transformation commenced at the top continuing downwards. A comparison of the Norman and Early English bays will show what miracles of cutting away in the triforium and clearstory passages would have been necessary; and further consideration shows that the ground-story piers, 19 ft. 4 in. high, would have been reduced from about 10 ft. square to octagons of 2 ft. 9 in. across. [The total dimension across the pier is 6 ft. 3¾ inches. The shafts project from the face of the octagon 12¼ in. The width of the octagon is thus 4 ft. 3¼ in. Supposing the stones are 9 in. on bed—less than the average which I find—2 ft. 9¼ in. is the greatest width of the octagon tile core.] The supposition that such transformation began at the top and continued downwards might derive support from the eastern bay of the clearstory, and from the strange form of the east pier of the ground-story, but the mouldings are actually later in date, stage by stage, from the ground-story upwards. In my opinion, the whole casing theory is a work of high imagination, without any,—even the slightest,—support from actual facts. Trumpyngtone intended to vault the nave, and we still see marble vaulting shafts in the spandrels of the ground-story arches, and the abacus at the triforium level cut away to allow the shafts to pass. The clearstory piers on the north side of the nave have sinkings designed to give shadow behind the intended shafts. When the rebuilding had proceeded on the north side as high as the springing line of the triforium arches, Trumpyngtone determined to forego the vaulting, and substituted a wooden roof. The two easternmost of the five Early English bays, on the south side of the nave, were erected some little time after the three adjoining bays and the four bays opposite on the north side. This is evident from the marked change in the mouldings. There is also no preparation on these two bays for vaulting the nave.

Decorated Work in the Nave.—After the fall in 1323 of the Norman bays on the south of the nave, Abbot Eversdone immediately commenced the rebuilding, and it is to him that we are indebted for the design of the five *Decorated* bays eastward of Trumpyngtone's work. I think these Decorated bays on the south side of the nave, and the lady-chapel, are clearly proved to be works of the same period; for in the small niches in the jambs of the lady-chapel windows are exactly the same mouldings to the bases and to the capitals as in the Decorated bays in the nave. These moulded bases to the niches in the lady-chapel are only 1 in. high, although those in the nave are about 1 ft. 5 in. Again, some of the carving is precisely similar in design, the style of the hair and also of the moustache and beard being identical with that of the heads in the nave. Also the same peculiar ball-flower occurs in both the nave and the lady-chapel. The carving in the nave is, indeed, much bolder, and worked with a firmer and more decided hand than that in the lady-chapel. This fact, and many other features, would lead one to conclude that the five Decorated bays in the nave are rather later than the lady-chapel, although designed by the same architect. At Eversdone's death, which occurred at the end of the year 1326, the rebuilding had probably reached as high as the floor of the clearstory-passage, and all above this level was continued by the succeeding abbot, as indicated by a change in the character of the mouldings, which are more shallow and flattened in their outline. An assertion was made some years ago, that "the walls at the backs of the Early English and Decorated arcading were introduced when the steep roofs of the aisles were removed." This assertion has been frequently copied; but the triforium arcades were never, as generally stated, entirely open. 1. The stones of the arches over the triforium bond with the walling at the back of the passage. 2. The masonry joints of the asserted filling-in are continuous with the piers. 3. The mortars used in the external walling, and in the arcade, have the same component parts. 4. There never was any relieving arch or double arcade to support the clearstory wall above (as at Westminster Abbey), which would have been essential had the walls been pierced. 5. The corbels on the south side of the nave, which carried the timbers of the roof over the aisle, are arranged irrespectively of the piers, and some occur in the walling said to be the filling-in of the arches. 6. It is evident the small doorways (still existing) which led from the passages into the roofs over the aisles, and also the corbels, are of the same date as the rest of the arcading.

The Choir and Nave Roofs.—The roof which covers the space between the rood-screen and the tower is formed of twelve principals, having tie-beams and centre-posts. The scantlings of the tie-beams average 15 in. by 12 in., with a clear bearing of 40 ft. The beams, which project 3 in. below the ceiling boards, are chamfered on the lower edge, and by means of these and of painted decoration, the whole surface is divided into panels. The whole of the nave ceiling was treated in the same manner, but at some comparatively recent date it seems to have been necessary to repair it. To save mortising and tenoning the new ceiling joists, boards were simply nailed to the underside of the original beams. A flat unbroken surface was thus given instead of a surface broken by projecting beams, as in the choir. There is much difficulty in deciding whether the roof timbers are of oak or chestnut. Some are clearly of oak, but I am inclined to think the greater part is chestnut; and the opinion is favoured by the fact that the forests of Hertfordshire abounded in chestnut trees.

Recently-discovered Decoration on the Choir Ceiling.—During the summer of 1875 the choir was repaired, and the *distemper* painting touched up. Whilst replacing one of the panels, a workman accidentally rubbed some of the new paint, and beneath it indications of an earlier design were brought to light. One by one the panels were cleansed by peeling off the outer coat of distemper, and a painted design of much beauty was exposed to view. This ceiling consist of sixty-six panels, arranged in eleven rows of six panels each. The two central panels of the middle row contain representations of our Lord and the Virgin, in each of the other rows three of the panels are charged with shields supported by angels; the three alternating panels bearing the monogram ſ þ c surrounded by wreaths and vine-leaves. The date of the painting has been put at between 1368 and 1376. I am disposed to think it is much later, because:—1. The painting is on the main beams and panels of a low-pitched roof. The bosses which occur at the junctions of the panels are the original ones, and are certainly much later in date than 1376. 2. The style of the lettering of the inscriptions points to about 1440. 3. The peculiarly-designed lions in the shields on this ceiling strongly resemble those used elsewhere in the middle of the fifteenth century. With reference to the two centre panels in the middle row, evidence of a later date is still stronger, for the canopies are embattled.

The Sanctuary.—The apsidal sanctuary of the Norman church, with the exception of a few alterations by Trumpyngtone (1214-1235), seems to have remained entire until 1257, when it was found necessary to pull down the whole of the eastern part of the church. At the rebuilding, which was immediately commenced, about 50 ft. of the north and south walls were left standing in order to form buttresses to the great tower. All the work eastward has been removed. The square east end of the new design was built upon the connecting wall which crossed the Norman church at the springing of the apse. On setting out the plan of the new design the two first bays occupied the space between the tower and the second Norman buttress to the eastward. Sufficient space was not left between this point and the east end for four bays of the same width (to make six in all); three bays somewhat wider than those to the west were therefore erected (to make five in all). In the three eastern bays seven arches occur in the triforium arcade in each bay, in lieu of six as in the two narrower bays. The vaulting shafts over the new bays continue down within the spandrels of the ground-story arches, but the vaulting shafts over the bays containing blank arches, stop at the triforium string. These bays of the sanctuary were erected just at the change of the style from the Early English to the Decorated. The latter style was not sufficiently far advanced to bring about an alteration in the outline of the clearstory windows.

The Eastern Chapels.—During the excavations in 1872, a cylindrical hole sunk in a block of stone was discovered in the south aisle of the ante-chapel; in this hole was found the lid of a small wooden box of Oriental workmanship, which probably contained the heart of the builder or special benefactor of this chapel. The manuscript in the British Museum states that, although the body of Roger de Nortone reposed elsewhere, yet his heart was buried before the altar of St. Mary of the Four Tapers, in the south aisle of the ante-chapel. This documentary evidence confirms what the architectural details and mouldings would have led us to conclude, namely: that the southern portion of the ante-chapel was erected during the Abbacy of Roger de Nortone (1260-1290). Some portions of the ante-chapel are characteristic of a few years later, notably the mouldings of the eastern window in the north aisle. These, most likely, were a continuation by the succeeding Abbot, John de Berkhamstede (1201-1301). I am disposed to think that when the works eastward of the sanctuary were commenced, the foundations of the whole of the eastern chapels were inserted at one time. The courses of the masonry and the similarly moulded strings are continuous the whole way round the chapels. The sanctuary and the ante-chapel made rapid progress towards completion, but at the time of the accession of Hugh de Eversdone, in 1308,—a period of fifty years from the insertion of the foundations,—the lady-chapel walls had only reached the level of the underside of the window-sills, a height of 10 ft. above the ground. During this period architecture had greatly developed, and the change in the mouldings and other details clearly prove the work could not have been continuous. In corroboration of this we have the record in the *Gesta Abbatum*, where Hugh de Eversdone is described as having "brought to a praiseworthy completion the chapel of the Sacred Virgin in the eastern part of the church, which had been begun many years before." Eversdone is also mentioned as having roofed the nave of the ante-chapel: "Moreover, that place contiguous in the shape of a square chapel, separating the sanctuary from the said chapel, with a ceiling, in the midst of which the Assumption of the Blessed Virgin is figured" (where the shrine of St. Amphibalus is now placed), "he at the same time took pains to finish." From this we gather that the vaulting of the ante-chapel was really never carried above the stone springers. Hugh de Everadone, abandonig the beautiful features of the central nave and aisles with their vaulting, removed four of the piers, cut down the stone springers, and covered in the space with a

panelled ceiling, and thus entirely altered the design of his predecessor. We gather from the records that Hugh had much difficulty in obtaining money. No doubt he was anxious to complete the ante-chapel, which had been exposed to the weather for many years, and thought it would be wiser to do so quickly, even at the sacrifice of a portion of the original design. The lady-chapel of Hugh is so rich in detail that it might have been suggested that he was anxious to bring his own individual work into increased prominence, and therefore purposely impoverished the ante-chapel.

The Recently-discovered Shrine.—Is it the Work of John de Marynes (1302–1308)?—Some 300 years ago, the beautiful shrine of the Protomartyr was shattered by sacrilegious hands into thousands of pieces. These pieces were used with the common rubble masonry for walling up the arches at the eastern end of the Saints' Chapel when the public passage through the church was formed. When these arches were opened out in the spring of 1872, about 2,000 fragments of Purbeck marble were discovered. Under the guidance of Sir G. G. Scott, these fragments have been ingeniously put together by means of shellac, and the structure was found to exactly fit the marks in the pavement in the centre of the Saints' Chapel,—traditionally regarded as the site of the shrine of St. Alban. The ordinary shrine consisted of three parts: the pedestal, the feretrum, and the canopy. The feretrum, or actual shrine, which contained the relics, was at times carried in procession. There are no remains in England of either a feretrum or canopy. The most perfect remains of pedestals are those of Edward the Confessor, in Westminster Abbey, and Thomas de Cantilupe, in Hereford Cathedral; both of which somewhat resemble the shrine of St. Alban. There are some portions of the shrine of St. Etheldreda at Ely, St. Werburg at Chester, and of the patron saint in St. David's Cathedral. The pedestal is of Purbeck marble, with the exception of the vaulting to the niches, which is of clunch stone, and painted. The general dimensions are about 8 ft. 6 in. long, by 3 ft. 2 in. wide, and 8 ft. 4 in. high from the top of the steps to the cresting. Mr. Ridgway Lloyd, in his pamphlet ("The Shrines of St. Alban, &c."), attributes it to the time of Abbot John de Marynes, chiefly on the authority of a reading in the "Gesta Abbatum." "Abbat John de Marinis caused the tomb and feretrum of St. Alban to be moved, whilst decorating it nobly, and expending on it more than 160 marks." De Marynes died in February, 1308. If by the end of 1307 the whole was completed, we may safely infer the pedestal must have been completed before this time. The mouldings, the carvings, &c., do not, however, contain a single detail that would identify this work with so early a date. 1. The carving is later and more naturalesque than that in the lady-chapel (*circa* 1320). 2. Some tracery on the sides of the niches has the same peculiarity as the tracery of two windows in the north wall of the lady-chapel, but of a still later form. 3. The earliest specimen of good flowing tracery is in the restored portion of the choir of Ely Cathedral, by Alan de Walsingham, commenced in 1322, but this is not reticulated work; whereas that in the shrine is thoroughly so. 4. I fail to find elsewhere rosettes of so early a date as 1307 identical with those on the shrine. 5. The finials have the same descriptions of *crumpled* foliage as those of the east window in the lady-chapel, but of a later character. We all so well remember the incident of the Lincoln Chapter-house, related by Mr. Sharpe, also that of Peterborough Cathedral. These and others of a similar nature must tend to confirm our conviction that the stones speak more truthfully, and must be trusted in preference to any written record. Unfortunately it seems to have been a frequent custom for a chronicler, whether intentionally or through carelessness, to credit a favourite man with work he never did. Mr. Edmund Sharpe, when visiting me at St. Alban's, fully confirmed my notes, and suggested that this structure might be the monumental tomb erected in honour of Eversdone, the abbot who had built and beautified the lady-chapel. This opinion I was not inclined to accept, although I am convinced the date of its erection was not prior to Eversdone's death in 1326, and cannot possibly be of the time of John de Marynes.

Is St. Alban's the longest Cathedral in the Kingdom?—For many years past it has been stated, and with local pride, that St. Alban's is the longest church (now cathedral) in the kingdom, and each history of the building has gladly availed itself of this tradition. I will give the result of no little painstaking of my own and Mr. Colson's, a fellow of the Institute, and surveyor to the Dean and Chapter of Winchester, who took dimensions specially for these comparisons. It is somewhat difficult to measure the total length of St. Alban's, and the dimensions taken by the north and south walls vary. The whole of my long dimensions have been taken on the axis of the building with an accurate steel tape, in 100 ft. lengths:—

		ft. in.	ft. in.
WINCHESTER ...	From plinth of buttress of east wall of lady-chapel to plinth of west porch	557 9	
ST. ALBAN'S.....	From plinth of buttress of east wall of lady-chapel to face of buttress of west porch	550 1½	
	The extreme length of Winchester Cathedral exceeds that of St. Alban's by	.....	7 7½
	Although the extreme length of Winchester Cathedral exceeds that of St. Alban's (with its unfinished porches) by 7 ft. 7½ in., yet the nave of St. Alban's is 34 ft. 4½ in. longer than that of Winchester.		
ST. ALBAN'S.....	From western face of main west wall to western face of tower	284 5½	
WINCHESTER ...	From western face of main west wall to western face of tower	275 7	
	The extreme length of St. Alban's nave (as seen on the outside) exceeds that of Winchester Cathedral by	.....	8 10½

The nave of St. Alban's is not only the longest in the kingdom, but the longest in the world. This 8 ft. 10½ in. does not fully represent the apparent excess of length of St. Alban's, as seen on the outside, beyond Winchester. The aisles of the Winchester transepts take off 25 ft. from the length of the nave aisles. There are no aisles to the transepts of St. Alban's. The repetition of the strong unbroken lines of precisely similar length at different levels in the nave and aisles at St. Alban's drives home to the imagination, in a way quite unique, the impression of length.

General Notes. — Contrary to the general custom, we find at St. Alban's the architecture on the north side richer than that on the south:—(1). There is evidence of an intention to embellish this portion of the Norman design in the nave;—part of the impost of the triforium arches being carved on the north side, while on the south there are simply plain stones or tiles. (2.) The Transitional arches of the interlacing arcade in the slype are decorated with a beautiful pattern on the north side; but this has not been carried out on the southern arches. (3.) The north-western porch is much more elaborate than the south-western. (4.) In the nave bays of Trumpyngtone, the north side is richer in detail than the south. It has been suggested that the north side, illumined by the southern suns, would justify additional enrichment. I think, however, at least in Trumpyngtone's case, it was not from local tradition or process of reasoning that this came about, but simply want of money;—which may thus reduce these odd differences to the rank of mere accidents. Many examples were exposed, during the restoration, of lead dowels in the joints of detached shafts. For instance, one of the shafts in the sanctuary, only 4½ in. in diameter, has three dowels in each joint. Sinkings were cut in the upper and lower surfaces of the joints. Holes about ¼ in. in diameter were drilled through the upper stones in each case, and melted lead poured in, which, when set, formed the dowel. The shafts were often sunk into both capitals and bases. In some instances, however, the shafts were not let into the capitals, but the same system of dowelling was employed. This system of St. Alban's is more ingenious than that at Westminster Abbey, for at St. Alban's the *dowels only* are lead, but at Westminster a space was left between the capital and the shaft, and by means of one hole (drilled immediately above the necking) lead was poured in, which, when set, formed a collar or bed over the whole surface. This, being exposed to the weather, has broken away the neck moulding, but at St. Alban's they are perfect to this day. In the construction of the fourteenth-century bays on the south side of the nave *oyster-shells* are used with the mortar. In many cases there is a complete bed of shells at the springing of the main arches. The mortar is very hard, and contains much lime. In two of the lady-chapel windows on the north side the upper spandrel is filled with tracery, worked in one stone of 3 ft. 9 in. by 3 ft. 7 in. This tracery is only 2 in. on face and 8 in. deep. In every instance the tracery in these spandrels has broken through in precisely the same places, owing to the settlement of the window arch. In the restoration the new cusping has been jointed at the points of failure in the old work. The average size of tracery stones is about 2 ft. 6 in. by 2 ft. In the ante-chapel wall arcading the new shafts are of clunch stone, and not let into either capitals or bases, but dowelled with slate into both. When fixed, the joints were so tight that the thin blade of a knife could not be inserted, yet within a few months the stone had shrunk ¼ in. in circular shafts 3 ft. 3 in. long and 3½ in. diameter. In the old work the shafts of like dimensions are mostly in the Barnack stone. Nearly every joint in the arches of the new work (executed in clunch) has shrunk since the time it was fixed. Some laid at $\frac{1}{16}$ in. thick are now $\frac{5}{16}$ in. These joints, however, do not affect the solidity of the construction. The clunch used in the interior is in wonderfully good preservation, but wherever exposed to the weather it has decayed. The abaci to the capitals of the ground-story piers of the Early English work are in a stone much harder than the clunch. The architects evidently distrusted the bearing power of the clunch, as in the abaci of the main arches, annulets, strings, &c., at different dates the hard stone was used. I have compared this hard stone, and found it identical with that at Ely, Peterborough, and Bedford, known to be from the Barnack quarries. The Norman stonework is axed; that of the Transition, chiselled; the Early English, bolster-tooled; the Decorated (including the bays on south of nave and the lady-chapel) ashlar is claw-tooled, the mouldings scraped; the Perpendicular, finely scraped.

Periods of Architecture.—The building may be considered as a huge architectural museum, containing work of almost all dates from the beginning of permanent building in England to the suppression of the monastery in the sixteenth century:—Roman, in part of its materials, Saxon, in the turned stone balusters; Norman, in the eastern part of the nave, the transepts, and the central tower; Transitional, in the slype; Early Early English, in the western porches; Middle Early English in the western part of the nave, the choir windows, &c.; Late Early English, in the sanctuary; Early Decorated, in the upper parts of the sanctuary, and the sanctuary aisle windows; Middle Decorated, in the ante-chapel; Late Decorated, in the lady-chapel, the bays on the south side of the nave, and the shrine; Perpendicular, in the screens, north and south windows of transepts, great west window, watching-loft, &c.; Tudor and subsequent styles, in the tombs, brasses, stalls, pulpit, &c.

In the discussion which followed,

Mr. Ridgway Lloyd said he had a few words to say in reference to Mr. Neale's statement that the Decorated bays on the south side of the nave were mainly the work of Eversdone. Without presuming to offer an opinion on an architectural question, he (Mr. Lloyd) would deal with the documentary records on the subject. With regard then, to the construction of the five Decorated bays, following the catastrophe of the 10th of October, 1323, it was ascribed by Mr. Neale to Abbot Eversdone, but documentary evidence showed that the reconstruction of the chief portion of the south side of the church was due to Abbot Michael Mentmore (1335–1349). This statement was contained in the "Gesta Abbatum," and was confirmed by a MS. in the British Museum. There was also a statement in the "Gesta Abbatum" that the shrine referred to was the work of John de Marynes. The general reliability of the records had been confirmed during the progress of the recent works.

Sir Edmund Beckett said he would say nothing upon the antiquarian questions involved, for he did not pretend to be an antiquary: he was only a "builder." As to the history of the St. Alban's Abbey which Mr. Neale had just read, it was in a general way pretty much what had been published before. Generally speaking, all who had had the honour of being acquainted with Sir Gilbert Scott for some time might be said to have known all that was contained in the paper. Although Winchester Cathedral was slightly longer than St. Alban's, the tower of the latter was far superior; indeed, the tower at Win-

chester was rather a failure, being stumpy and squat in appearance. The tower of St. Alban's was one of the finest Norman towers we possessed,—not the finest, which was perhaps that at Tewkesbury. People were continually regretting that the roof of the nave of St. Alban's was not of the old pitch; but it should be remembered that if the old pitch of the roof were to be restored, the tower would lose its distinctive appearance of loftiness; in other words, the tower would be dwarfed by the high-pitched roof. If ever a roof of high-pitch were put over the nave, however, its tendency to dwarf the tower might be diminished by adding in some way to the height of the tower. It would seem that there was at one time something in the nature of an elevated building either in the middle of the tower or at the four corners. A high-pitched roof would be 25 ft. higher than the present roof. He thought that if the turrets which seemed to have existed at one time near the west end of the building were restored they would greatly relieve the long and bare outline of the roof. Where the blank wall existed towards the west end the abbot's house formerly stood, the length of the nave being so great that the cloisters only occupied about half the length. As one of the restoration committee he did not agree with those who would, from mere antiquarian reasons, retain that wall without piercing windows in it. He hoped that funds would soon come in to enable the more imperative works of reparation to be completed, after which they might hope to restore the turrets and the west end, as well as to do something with the great blank wall referred to.

The Rev. W. J. Lawrence, of St. Alban's, expressed regret that in the present age, when so much was spent on mere luxury, it should be difficult to get together funds in order to carry out the mere constructive reparation of the fabric.

Mr. S. Flint Clarkson said Mr. Neale's careful paper had dealt at first hand with much discussible matter. The existence of an apse in the Norman church was, of course, probable, the prototypes of the design being known. Still the only, and not very solid, foundation for that superstructure appeared to be the word "*Concamerationem*," in the "Gesta Abbatum,"—a word that might, to all seeming, stand equally well for a barrel-vault. Some service would be done if instances, in writings of the middle of the thirteenth century, could be pointed out, where that word was clearly used for the semi-dome of an apse. Mr. Neale's courage in disposing of what he had called "the casing theory" might encourage a rash person to hint a doubt as to the sufficiency of the grounds for believing that the Norman church extended so far to the westward as the present west end. There was a strong bias that way, which might be confirmed by discoveries; but on the first blush foundation walls of flint, with courses of tiles in them, would not appear to be below nor beyond the science of the builders of the thirteenth century. Much might be added to what had been said as to the dominant influence of the Norman structure over the works, which in each succeeding age modified its original forms. The central tower, for instance, had preserved the transepts unaltered in the main. It forced the sanctuary and the sanctuary aisles for at least 50 ft.,—practically for their whole length,—to take their present very special shape, in the thirteenth century. Probably to the central tower (or, in other words, to the fact that the Norman building was a splendidly proportioned cruciform church) was due the commencement at the west, when, after a century of pause, the great building abbots began to tamper in earnest with the original design. But it was difficult to go the whole length Mr. Neale would wish, and to attribute, for instance, the level of the floors in the ante-chapel and the lady-chapel to the carrying forward of the Norman levels in the sanctuary aisles. Most probably the eastern arm took, in every part, an additional elevation, bearing relation to that so obvious in the nave of the sanctuary. Saxon balusters (so-called), like those in the transept, could not easily be claimed (as by Mr. Neale) for the sanctuary triforium also. There were six of them on the east side of the south transept, and only two in the north transept, when six at least might have been used there, as in the south. John de Cella's floor-level, in the western portion of the nave, had been spoken about in the paper, with that originality,—that spirit of personal inquiry and of thinking for himself,—which Mr. Neale had shown throughout. His (Mr. Clarkson's) own idea was that De Cella had no very definite purpose in making the change of floor-level. But as plausible conjectures could be put forward, it would evidently be unwise to insist strongly on so elementary a proposition. In addition to Mr. Neale's suggestion of a wish to increase the amount of internal rise eastwards, there might be mentioned the desire to decrease the external acclivity, in the space westward of the doors. Excavations just now in hand might possibly verify the attribution to De Cella of a desire to reach a more solid substratum than that which had probably contributed to the ruin of his first efforts on the spot. Failure from defective foundations seems to have been by no means rare in the building. The extent to which De Cella intended to carry the lower level eastwards had apparently been left by Mr. Neale in what might prove to be an ultimate condition of uncertainty. This was a point of much interest just now, when the restoration of this lower floor-level was to be made,—as part of a radical change in the porches and western front at large, from the ungainly figure maintained since the sixteenth century. The floor of the western bay of the nave being lowered, the same lowered floor-level,—though never before in actual use in the building,—would hereafter be an appropriate part of what might be expected to be in the hands of the architect who had the work in charge, one of the finest of modern ecclesiastical works. One portion of Abbot Trumpyngtone's work,—away from the west end,—in the south transept, furnished evidence of an itching to meddle more and more with the eastern parts of the church. It might also furnish an admirable test-case for any people anxious to contend about principles of restoration. The chapels east of the transept were dark; this transept was much underlighted, even according to the notions of an earlier time, if we were to judge by the amount of original lighting in the north transept. In the Norman design of the south transept the abutting buildings were allowed to prejudice, to what Trumpyngtone considered a painful extent, the lighting of that great area. He, therefore, formed the two strange windows in the west wall of the transept. They were probably blocked up again, when the passage over the cloister-roof was formed,—before the immense south window was inserted, and began to pour in—however modified by coloured glass—enormous floods of light. By odd accident, Trumpyngtone's two windows had been re-opened at the present time, when the clear glass of the great end windows of the transepts admitted an extent of raw light that would be greatly in excess even if entirely unaided.

Sir Gilbert Scott moved, and Mr. Street seconded, a vote of thanks to Mr. Neale for his paper, and both gentlemen highly eulogised the industry and ability which Mr. Neale had displayed in delineating the building, Mr. Street commending Mr. Neale's assiduity and method of work to other architectural students, especially to those who laboured under the delusion that a knowledge of their profession could be learnt from books.

The vote of thanks having been carried,

Mr. Neale briefly replied, and in doing so challenged Sir Edmund Beckett to make good his assertion that the subject-matter of the paper was to be found elsewhere. Mr. Neale has since sent us the following note:—"I feel compelled to make good omissions in my reply, caused by my anxiety to be as brief as possible. To reply fully to all the points raised by Mr. Lloyd and Mr. Clarkson, it would have been necessary that I should have re-opened the question at considerable length. I ought not, however, to have omitted to thank them both, not only for calling attention to important points at the meeting, of which I have much to say hereafter, but also for help at other times. I may confess that to Mr. Clarkson's unsparing criticism, always and for a long time at my service, is due some of the spirit of radical inquiry and of original research which I had hoped, and still hope,—notwithstanding Sir E. Beckett's sweeping imputation of mere copyism,—all who know the abbey thoroughly will find in almost every line of my paper."

The Local Government of London.—The Queen's Printers (Messrs. Eyre & Spottiswoode) have just published copies of a Bill to create a municipality for London, to be introduced next Session; also another Bill, to be introduced into the House of Lords by Lord Camperdown, providing for the direct election of the Metropolitan Board by the ratepayers.

GRANITE MONOLITHS.

Sir,—The readers of the *Builder* and all lovers of architecture would be glad to learn from the statement of Messrs. Freeman & Sons as to the capabilities of modern quarrying in the *Builder* of December 8th that we are not so much excelled in such quiet victories over nature, by ancient nations, as has been supposed; and their mention of "throwing over rocks" containing 1,500 tons of stone calls to mind the fabled feats even of the Titans and Giants in their wars against the gods.

It augurs well for architecture, not for its facility of furnishing "Needles," which are not a want of the age, but for its promise of greater perfection in such architecture as the age does want. It wants large stones for all kinds of memorial pillars, and for monuments generally, it being in the nature of such structures and of pedestals to colossal statues and equestrian statues to demand as large stones as can be procured; and to receive an additional grace from them, and increased expression of durability. It needs also for columns of porticoes and colonnades larger stones than have hitherto in modern times been used, for want of which, in great works, the columns look too often like piled-up cheeses, and almost as unstable. It is most consonant to the nature of all such detached supporting features of architecture, external or internal, as well as attached columns and pilasters, architraves, friezes, cornices, pediments, window and door cases, to be in as long stones as possible. In large columnar edifices large stones are essential often to truth of constructive principle. For want of stones 15 ft. or 16 ft. long, in the Custom House or Revenue Building, Liverpool (where are three octostyle porticoes of columns, 5 ft. 2 in. diam., and intercolumniations of two diameters), the architrave had to become a straight arch.

But largeness of stone, with fewness of joints, is an element of perfection in trabeated or beamed constructions throughout,—in walls as well as columns and dressings,—an element that sublimates and expresses power. It is in the nature of things that it should be such; and increased facilities for obtaining large stones are tantamount to an invention or discovery in building material. While otherwise pleasing, largeness of stones has the practical virtue of rendering walls less dependent on cement, more united, and less liable to unequal settlements. It would favour at any time the pleasing scheme of preparing the materials of an edifice at a distance, so as to avoid noise and bustle on the spot, as in the case of the building of Solomon's temple.

The chief objection to bricks in important structures is not their artificiality nor their colour, which may be made equal to that of any stone. It is their smallness and consequent meanness, and the cut-up look they give by nearness of joints; in saying which I mean no disparagement to that invaluable manufacture, nor to the practice of rustication or the emphasising of the joints as a means of mural relief or texture. I would only suggest that the stones and distance of joints should bear some proportion to the scale of the building in which they appear, and that in horizontal rustication long stones would always be agreeable to the eye, as would long and thick ones in basements and stylobates.

Even the Gothic style, which in drawing more on statical science is more independent of magnitude of material than the Classic, would not be adverse to large stones, which might be used for finials and pinnacles of all kinds, for the last crowning portion of spires, and for detached piers of nave arches, as they might for the piers of bridges in the water. What facility do colossal stones present for the construction of lighthouses!

The most sublime of builders, the ancient Egyptians, showed their predilection for large stones in other works than obelisks. The Great Pyramid seems composed of masses of rock, and still more enormous blocks are found roofing the chambers within. Herodotus speaks of a shrine in the Temple of Latona, at Butos, formed of one stone, having equal sides, each 40 cubits long; and of an edifice at Sais, brought from Elephantine, hewn out of a block 21 cubits by 14 cubits, and 8 cubits deep; and Denon, the French traveller in Egypt, has given representations of several small monolithic temples. But the largest monolith in the world, perhaps, is the Temple of Kylas, an isolated excavation at Ellora, in India, every part of which, exterior

and interior, which comprises several stories, is richly and elaborately carved. It differs from all or most other monoliths in being still attached to the living rock.

The subject suggests to us that perhaps the age of Colossi is not yet passed, and that the wonders of the ancient world in sculpture of Brobdingnagian proportions are still to be emulated in another and better spirit. Colossal figures are sublime objects; and no modern nation need feel ashamed of a walk of art in which the Greeks in their best days, and in the person of their most celebrated artist Phidias, have trod before them. It seems to have revived already in the statue of Bavaria, at Munich, 54 ft. high. That statue is of bronze; but stone and marble, if not so durable, or so warm and rich-looking, as bronze, are, I fancy, more favourable to the ideal in sculpture,—more suited to, or a less departure from, the complexion of the Caucasian, or highest variety of mankind, than the dark metal. But a walk less trodden by the ancients remains to us, that of animal sculpture: representations of lions, horses, eagles, and the combination of the equine and human forms in the equestrian statue. The lion, one of the sublimest objects of the world, seems a peculiarly fit subject for colossal representation.

Be all this as it may, proprietors of granite and marble, limestone and freestone quarries, may imagine the Genius of Architecture looking down in approbation on their endeavours to supply the largest blocks possible at reasonable rate; and if a price-list could be framed and published showing the ratio of increase in price with increase of size, it would enable architects to include in their designs largeness of stones as a means of impressiveness and power, where desirable to do so.

As I have already intimated, though Cleopatra's Needle is welcome to us as an antiquity, we do not want new needles. I say this with all due deference to the gentlemen of the London Committee for erecting a memorial to the late Prince Consort, who doubtless had peculiar and sufficient reason, in such an exceptional case, to desire the obelisk form. There is more sense in the obelisk as a monumental pillar than in the column. It has its types in nature, and every blade of grass would keep it in countenance. But the obelisk is not beautiful *per se*, and it has no relation to our architectural forms. And if the monolithic needle is not wanted, much less, if possible, is the builded one, of which we have already too many examples; and it is to be hoped that Cleopatra's Needle, when set up in London, will not propagate its species, and stud the land of its exile with young needles, which we could not very reverently call "Victoria Needles." An Egyptian obelisk, formed of one piece of rose-coloured granite, covered with hieroglyphics, and with the lustre of thirty-five centuries of history,—with Pharaonic and patriarchal associations, is a very interesting object. But an obelisk built up of small stones, with only rude joints for hieroglyphics, and without any robe of mystery, is a very different thing, even should it be built on the back of an elephant, or on four balls, as at Dublin; or even should it be varied in its horizontal section to hexagon or to octagon, like one before the Cathedral of Catania, in Sicily. Without the light of other days upon it, no amount of surface decoration can render an obelisk a very delightful object in England.

SAMUEL HUGGINS.

P.S.—The above was written while ignorant, from having seen neither Dr. Schliemann's "Mycenæ," nor your or any other review of it, of the countenance given to my plea for larger stones than have been generally employed in modern architecture, by the association of megalithic construction with the names of Agamemnon and other kings and heroes of the Trojan expedition.

FURTHER NOTES FROM BIRMINGHAM.

THE Birmingham School Board, at their meeting on the 6th inst., accepted the tender of Mr. H. Bennett, builder, of Rugby, to erect new schools in Dixon-road, for the sum of 12,358*l.* 11*s.* They also voted a precept requiring the sum of 46,500*l.* to meet the expenses of the Board for the coming year, a sum which will require a rate of 8*d.* in the pound. A great outcry has been raised against this proceeding by a small section of the ratepayers, but the majority appear to recognise the good work now being done by their representatives on the Board, and the money will, on the whole, be cheerfully paid.

An estate at Rubery-hill has been purchased by the Birmingham Town Council, containing about 152 acres, on which they propose to build a new lunatic asylum. Messrs. Martin & Chamberlain have been appointed architects without competition, a proceeding which called forth some expressions of disapproval at the Council meeting on the 7th inst. The outline plans are now awaiting the approval of the Lunacy Commissioners. At the same meeting it was also agreed to purchase 2,396 yards of land in Icknield-street West, on which new public baths are to be erected, and a sum of 520*l.* was voted for new boilers and piping for the Kent-street baths. It was also agreed that a sum not exceeding 10,000*l.* should be spent in laying out, planting, fencing, and erecting a lodge, refreshment-room, and other buildings in Small Heath Park, a recent gift to the town from Miss Ryland, to whose liberality the town is now indebted for two parks.

A new recreation-ground of 4¼ acres area, and of the value of 12,000*l.*, was formally presented to the town on the 1st inst., by Mr. W. Middlemore, a gentleman well known as a philanthropist in connexion with his emigration homes for poor children. The ground is situated on the edge of the borough adjoining Aston, and is well laid out with trees and flower-beds; the walks are covered with asphalte. The garden will doubtless prove a great blessing to the poor inhabitants of the district.

The tender of Messrs. C. Jones & Sons, builders, of Belmont-row, has been accepted for the extension of the Free Public Library, Museum, and Midland Institute.

By a recent Act of Parliament, the Birmingham, Tame, and Rea District Drainage Board was constituted, and the first meeting of the Board was held in the Council-chamber, Moor-street, Birmingham, on the 6th inst., when Alderman Avery was elected chairman, Mr. William Harris was appointed secretary, at a salary of 200*l.* a year; Mr. W. R. Hughes, treasurer, at a salary of 50*l.* a year; and Mr. E. J. Hayes solicitor to the Board, at a salary of 200*l.* a year. As Mr. Hayes is already the town clerk of Birmingham, that appointment will have to be approved by the Town Council, and some difficulties may arise. Mr. Tile, the borough surveyor, has been appointed surveyor to the Board, *pro tem.*, pending the appointment of a permanent surveyor. The Board will, under their authority, take over the whole of the works, sewage farms, &c., in the district, with their staff and plant, as going concerns, and construct intercepting sewers, whereby the whole of the drainage of the watershed will be carried to a common outfall. It is hoped and believed that this arrangement will be superior to the present arrangements, and that no town or village will, as now, be a nuisance to its neighbour. The works established by Scott's Sewage Company for carrying on the manufacture of cement, &c., on the sewage farm at Aston, have been given up to the Sewage Committee.

A great deal of dissatisfaction is expressed by the gasfitters of Birmingham at the practice of the Gas Committee, who have, since the works were taken over from the old companies, not only supplied gas, but pipes and fittings as well. Having a large trade, and the capital of the borough to boot, they are able to compete successfully in most jobs against private traders, and naturally with the result above named.

The Health Committee have recently determined to adopt a new cover to the closet-pans now in very general use throughout the borough, by which, it is said, they become almost hermetically sealed, and to send them in that condition direct to the farms on which their contents are to be utilised. For this purpose they have recently determined to construct two basins on the canal, one at Aston, and another in Anderton-road. The contract for these has been let to Messrs. Davies Brothers, builders, of Watery-lane, and the works are now in progress.

The death-rate of the borough for the third quarter of the year is 22·25 per thousand.

The Birmingham Board of Guardians some time ago appointed a deputation to visit and inspect separate schools in order to gain information in erecting the proposed new workhouse schools for Birmingham. They now report that they visited the Reading and Wokingham District Schools, Stockwell Orphanage, the Children's Home, Victoria Park, and the Home for Little Boys at Farningham, Kent. The latter home consists of thirteen cottages, a small infirmary, workshops, store-room, school and chapel, with a separate house for the headmaster (who is also the manager) and the under masters. Each house is under the superintendence of a man and his wife, who are called father and mother, who appear to act as such, and to have the affection of the children. The "father" is also the industrial trainer. The boys over ten years of age work at various trades, and the younger ones are taught to knit and sew. The deputation recommend that the new schools be built and conducted upon the model of the Farningham Home, with some modifications. They also report that they had an interview with the Poor-Law Board (query, Local Government Board?), and returned with a deeper conviction of the wisdom of the adoption here of "cottage homes" for the children. At a meeting of the Board on the 5th inst. this report was approved, and referred to the School Committee.

Birmingham builders sometimes go far afield for their work. The Sheffield Board of Guardians have recently accepted the tender of Mr. J. Garlick, of the Saltley Works, Birmingham, for the erection of their new workhouse at Pitsmoor, at a total cost of 134,800*l.*, and the works are to be commenced at the beginning of the new year.

Many Birmingham builders pride themselves upon the quality of their brickwork, and justly, but few, indeed, seem to have the same feeling as to their joinery. Competition, doubtless, is the main cause of this inferiority, but architects who desire it may easily remedy a state of things which is, in the main, disgraceful.

Birmingham possesses two theatres. An application for a licence to erect another in the Aston-road was recently made to the magistrates without success. The Theatre Royal, situated in New-street, is fitted with very bad entrances. The box-entrance, from New-street, is under one bay of a sort of piazza, in stucco, and is cramped and inconvenient. The pit-entrance is up a long passage, some three yards wide, between a beerhouse and a fruit-shop, and opens upon the back-yard of the beerhouse, with its water, necessaries, &c., through which all must pass to enter, to find a low, crooked, whitewashed passage, fitted with doors and ticket-box. The gallery-entrance abuts upon a piece of waste ground, left by the formation of the new street some years ago, and which is a depository for old bricks and rubbish and nuisances generally. Inside, the gallery is approached by flights of slight deal stairs, which appear to be anything but strong enough to bear a crowd, and would burn very rapidly if fired. The *débouché* upon the gallery at the top, reminds one of cavernous recesses about the dome of St. Paul's Cathedral, and is almost as dirty and uninviting. The feeling on the part of the management seems to be that anything is good enough for the gods in the gallery and the devils in the pit. The Prince of Wales Theatre is in Broad-street, and has recently acquired a new frontage of lofty shops and dwelling-houses, with box, pit, and stage entrances therein, the gallery having a separate entrance in a side-street, and all are good and very convenient. Each theatre is fairly supported by the public. They have regular stock companies, which are capable of rendering fairly most of our older dramas, and which are frequently supplemented by the addition of "stars" of more or less brightness, whenever it pleases them to appear in this latitude.

E. G.

THE LATE MR. JAMES PAIN, ARCHITECT.

ON the 13th inst. died at his residence in Limerick, at the age of ninety-seven, Mr. James Pain, one of the oldest, if not the oldest, architect in the United Kingdom. The deceased gentleman was born in London, of a well-known family distinguished in architectural and building affairs. He served in the office of the late John Nash, by whom he was sent to Ireland to superintend some important works, and eventually, with his brother, Mr. George Richard Pain, settled in Cork and Limerick, in which counties, as well as in the south and west of Ireland generally, the firm of James & G. R. Pain enjoyed for many years an extensive practice. Among their works may be noted Mitchelstown Castle, erected for the Earl of Kingstown, a noble pile in the late Tudor style; Dromoland Castle, for the Earl of Inchiquin; Lough Castle, for Lord Gort; Elm Park, for Lord Clarina; and many others. Adare Manor, the residence of the Earl

of Dunraven, was begun by them, and afterwards passed into the hands of the second Pugin, and finally into those of Mr. P. C. Hardwick. They also designed the Cork Courthouse, possessing a splendid Corinthian portico, referred to by Lord Macaulay in his history, the Cork and Limerick prisons, Thomond and Athlunkard bridges over the Shannon, and several large churches, both Protestant and Roman Catholic, in the cities of Cork and Limerick. Mr. G. R. Pain died at a comparatively early age, but Mr. James Pain continued to reside in Limerick, and to practise his profession till within the last few years. He enjoyed a deservedly high reputation for his upright and honourable course of conduct, both amongst his employers and professional brethren, and, it may be added was highly respected by the working men of the local building trades as a just and impartial judge of the questions which so often arise between them and their employers. Mr. Pain was a distinguished "Mason." His remains were interred in the Cathedral of Limerick on the 17th inst. W. F.

LIMESTONE.

The first of a series of six "Gilchrist Science Lectures for the People" was delivered in the Brighton Dome on the 15th ult. by Dr. W. B. Carpenter, F.R.S., who took for his subject "Limestone." He said that when, about six years ago, he had the great honour of addressing in the Dome the largest audience to whom he ever spoke on a scientific subject, he placed before his hearers the general evidence of the fact, now perfectly familiar to all geologists, that the chalk of our cliffs—that great chalk deposit which, either coming to the surface or buried deep below, covers a very large proportion of the south-west of England and immense areas on the Continent of Europe, stretches into Asia, and is found in America—was all formed really at the bottom of the sea, by the accumulation of the remains of very minute animals, belonging to the group they called *foraminifera*—shells so minute that hundreds of them would only weigh a grain. And at the present time that process of formation was going on in the bed of the Atlantic so extensively that very nearly the whole of that bed, between the coast of Europe and America, was covered with a deposit of white mud, called *globerigin*æ, so termed because composed of the shells of one particular kind of the *foriminifera*. The *Challenger* Expedition had confirmed this fact, and it had found that the formation of this *globerigin*æ was going on over vast areas of other oceans. But there was no part where it was so continuous and extensive as in the North Atlantic, and, therefore, he would direct attention to it there as being most interesting to them. Six years ago he presented a view to them which had become very familiar among geologists, namely, that the mud of which he spoke was really the continuation of that which was being formed in the Old Chalk period,—that the great bed of the Atlantic had been nothing else than what it now was, since the time when the borders of it were raised above the waters; that the process which had resulted in the formation of our chalk cliffs had been going on during the whole of the Tertian period. The table (suspended above the platform) of the principal limestone formations, presenting their geological succession and the chief animal components of each, would show the position of the limestone beds, or rather the calcareous beds in the series. He made the distinction between limestone and calcareous beds, although "calcareous" simply meant composed of lime, because there were many things calcareous which they did not term limestone. For instance, they did not call chalk a limestone in ordinary usage, but it was as much a limestone as marble, or the great carboniferous limestone in the neighbourhood of Bristol, Derbyshire, and Yorkshire. The difference between chalk, marble, and limestone was merely one of, so to speak, texture; the chemical composition of them all was the same. If they took a piece of either, put it into water, and poured into the water a little spirit of salt, or nitric acid, or sulphuric acid, though the others were better, they would have much effervescence, because carbonic acid was given off. All our aërated waters were made in this way,—by treating this limestone or chalk with an acid. Zinc and carbonic acid were the component parts of all, but their texture was different. First, they saw what chalk was. During the visit of the British Association, there was in the temporary museum at Brighton—and he was not sure that it was not now in their present museum—a piece of the white *globerigin*æ mud, which they dredged up from the bed of the Atlantic. Nobody would know the difference between it and chalk, either in chemical composition or in texture, or in microscopical characteristics. It was perfectly true chalk. It was simply carbonate of lime, and its texture was derived from this,—a mere heaping together of separate particles, which were originally distinct minute shells, but were now decayed away. In some beds they were well preserved; in others they were not so. But if they took a piece of what was commonly called limestone,—the compact, hard stone, good for building purposes, or for making roads,—they would not find a friable texture, but a subcrystalline texture; the stone was hard, and broke with a kind of crystalline fracture, and it was obvious that the particles had undergone a considerable re-arrangement. And yet they found in many of these limestones the evidence of their having been composed not so much of minute shells as of larger shells or corals. Some of his hearers had been at Clifton, and seen that magnificent series of limestone rocks which borders the river Avon; or they might have been in Derbyshire, and seen some of the rocks there; or in Somersetshire, and seen the gorge in the Mendip-hills, in which there were limestone beds made up of fossil corals or shells, of which he would afterwards show some actual sections. In a large part of these limestones they would find no evidence of organic structure at all,—nothing that would lead an uninformed person to suppose that animal life had anything to do with the formation of them; and yet he was going to lead them to the conclusion that it had everything to do with them. In fact, there were no limestones of any extent that had not been the result of animal life,—the accumulation and remains of the hard parts of animals of past periods. Take marble. It was a pure white,—the typical marble, the statuary marble,—and something like loaf-sugar in appearance when broken: it was composed of minute crystals, regularly aggregated. There was no peculiar distinction between marble and limestone excepting in the degree of polish they took; but some limestones took a polish like marble, such as those from Derbyshire. There was a greater distinction between limestone and chalk. To take other forms of limestone, there were the Bath stone or Portland stone, which was extensively used in London and the southern counties; the stone, a considerable amount of which they imported from the north of France, and which was technically called oolite, or egg-stone, or roe-stone, because composed of little rounded grains resembling the roe of fish. If the stone were put in water, and an acid added, they would again have gas given off and lime dissolved. It was only another form of the same stone they had been considering, and seemed to have been produced by shells and corals washed by the action of the sea into a fine stone, and subjected to rain, charged with carbonic acid taken from the atmosphere in its descent, which had filtered through and dissolved the surface layers,—the water, charged with carbonic acid, sank deeper, and formed layer after layer around each particle, till each grain resembled an onion, in having coat over coat in concentric spheres, with the layers cemented together by carbonate of lime. He would now proceed to trace the succession these limestones presented from the earliest periods to the present time, being desirous of establishing this fundamental fact: that the larger number of these limestones gave distinct evidence of organic structure, which afforded a strong presumption that one great bed, which had what they called the mountain limestone,—that which underlay the coal-measures of the country, and rose to the elevated regions of Yorkshire, Derbyshire, Somersetshire, and so on,—although it presented in its greatest parts no evidence of organic origin,—also had it. He would explain how it was that it came to lose traces of this. Let them begin at the very beginning, so far as yet known to them. They had a few evidences in this country of a great group of stratified rocks, of much earlier origin than they were formerly acquainted with. The Silurian series they thought was the oldest, but they knew that in North Wales there was a series below that,—the Cambrian, chiefly composed of sandstone and grit. The Laurentian, on the borders of the St. Lawrence, in North America, was another curious rock, very deep down, in which had been discovered a bed of limestone, not pure, but arranged in a regular series of layers alternately between limestone and a mineral called serpentine, which was a compound of silex and magnesia. The opinion was formed that this limestone must also have had an organic origin. It was greatly similar in many respects to the coral reef, and Dr. Dawson, of Montreal, first obtained microscopical evidence of its really being an organic structure, and that upon the basis of his (the learned speaker's) observations upon certain forms of foraminifera. It was a wondrous discovery this. They had limestone of organic structure at the very earliest period at which it was conceivable, so far as they knew at present, that life was introduced into this planet. In the various beds of the upper and lower Silurian in Wales, where there were large quantities of sand and grit, and the great slate deposits, they found certain limestone: in the neighbourhood of Dudley, for instance, the whole of which was clearly composed of organic remains, chiefly a type of the animal called crinoid. There was no doubt the Silurian series was made up of shells, corals, and the remains of the crabs and lobsters of those days. Then they came to the Devonian series, and found some amount of organic origin. They were so full of corals and shells that they had no doubt they were entirely comprised of them. Then they came to the great formation—the Carboniferous, which was pre-eminently a limestone formation. Along the Bristol river they had beds 1,800 ft. alike of this one series in which they could trace no organic structure at all. In certain beds, however, they had evidence of corals. There was one he remembered in his youth—for he was born at Bristol—which was composed entirely of a particular kind of shell. He carried home a mass entirely an aggregation of shells and of stems of the crinoid; but that rock had been blasted away. It was particularly good for road flints, and was carried into the neighbouring counties. And then there was the magnesian limestone found in the North of England. Though limestone united with magnesia, it was clear it was originally formed of the same material. All proved that wherever limestones occurred they presented, more or less distinctly, organic origin. There was one along the south coast of England, which was pre-eminently well marked—the *liassic*. In Dorsetshire the *liassic* cliffs had much clay mixed with them, but he found the substance was entirely composed of shells and the fossil called *belemnite*. There was no doubt it was a clear accumulation at the bottom of the sea, of the shells and fragments of corals which had lived their life in the ocean. Now they came to the *Cretaceous*, and next to the Tertiary series, in which there were very remarkable deposits of limestone. In one there was the largest *foraminifera* they knew of. It was called the *nummilitic* limestone, and went along the south of France, the north of Africa, through the Alps, Hungary, the Carpathian Mountains, and Turkey, into Asia Minor; along the north coast of Africa to Egypt, and it was of that stone the pyramids of Egypt were built. He had examined the rock on which they were erected, as well as the stone of which they were composed, and it was this *nummilitic*. The point he wished them to come to was this: that in the whole series they had most distinct evidence of all these limestones being made up of the aggregation of the skeletons of animals that inhabited the sea. Now and again they had lived in fresh water, as the *Purbeck* limestone showed. Coming back to the carboniferous limestone, they came to ask how it lost all traces of organic origin. They had abundant traces of the metamorphosis of limestones. They had evidence of the purest white marble being a metamorphosed form of *oolite*, mainly, no doubt, through the percolation of water in the neighbourhood of volcanic rocks, the water having power to dissolve the lime and arrange it in crystalline form. There was one instance of this at home. If they went to the Giant's Causeway they would see chalk cliffs with the projecting headlands bored through by the action of the waves, all having the character of the ordinary chalk; but as they approached the Giant's Causeway—a great outbreak of basaltic rock—they would find that this chalk became hard, and when they approached the junction of the chalk with the basaltic rock they would notice that it was converted into a crystalline structure like sugar-candy almost. They called this metamorphic action, and they believed a great deal of it had gone on in the mountain limestone. He should not go into all the arguments, but remark that while

coral reefs had still preserved their character and were recognised as fossils, his own mind and the minds of other geologists had been coming to the conclusion that the deep-sea beds of the carboniferous limestone had been formed originally, not exactly as the chalk, but of larger shells, and subsequently metamorphosed. They had good reason to believe they had undergone such a metamorphosis. Geologists knew well that the great break between the series of ancient life and the secondary series took place some time after the conclusion of the palæozoic period, that there was then a great crumpling action in the crust of the globe in our part of the sphere. It did not take place in Russia, but in all our portion of Europe, and in many other parts of the globe this crumpling action caused a lateral compression which forced the strata into folds, brought up the mountain limestone to the elevation which gave it its character, and broke up what were continuous deposits of coal into what they now called coal basins. In this crumpling motion they now knew that an enormous amount of heat was developed, and he believed that a great deal of the volcanic action on the surface of the globe was produced in this manner. They would, in the course of the lectures, have explained to them the present geological doctrine of mountain-making, and these volcanic operations going on in various parts of the globe at the present time. They had here evidences of the production of heat, and it was just this very production which gave rise to the metamorphoses. Professor Hall had made a very careful and expansive examination of the carboniferous limestone in different parts of Ireland, and assured him that he had no doubt whatever that the metamorphic action there was just in proportion to the amount of disturbance; that where there had been a great deal of this crumpling of the strata, throwing them into fields by the lateral pressure, and where there had been great heat developed by that pressure, he found in the character of the limestone evidences of its metamorphosis. Here is what he should call a "clincher," not a proof, but a strong probability. Could they point to any area of the globe where the carboniferous limestone existed undisturbed pretty nearly as it must have been formed? Yes, they could in Russia. As he had mentioned to them, Russia was a remarkable instance. It had its ups and downs as a whole, but very little disturbances. Russia was an immense plain till they came to the Ural mountains, and there they found beds of carboniferous limestone, whose original condition they believed to be composed of shells, which they called fugiline. These he would show them by the oxy-hydrogen light. They were about the size of the old carraway comfits. The accumulation of this mixed fugilinæ limestone of Russia was equivalent to our carboniferous limestone. This was the outline of his argument, and it was attracting a good deal of attention at the present time. Only the other day a gentleman had come to him from Belgium, a curator of one of the principal museums in that country, who had come over to England mainly for the purpose of hearing the state of English opinion upon this subject. He was engaged in working out the carboniferous limestone of Belgium, and had come to him (Dr. Carpenter) to learn his views, and gather any information which could throw light upon the conclusion to which he was himself coming from his study, as to what was the source of this enormous limestone deposit, of which we had so much in this country, and which was pre-eminently the limestone deposit of geology. They meant that this series of carboniferous limestone was equal in extent to all the rest put together. They would, therefore, see this was a very interesting question. If all other limestones had this organic origin, and if they could account for the loss of the original organic structure of the carboniferous limestone, as he had shown them they could, there was very strong presumption that this had a similar origin,—that those deep-sea beds were really formed at the bottom of the great ocean just in the same manner as the chalk, and that they were raised to the surface by those great alterations of level of which he had so often spoken, and, either before or after they were raised,—most probably after,—underwent this metamorphosis by the great crumpling up which took place at the end of the palæozoic period. He would present them with a series of illustrations, and while they were being prepared he would say a word about the uses of this limestone. Of course, one great use was for building, another was for road-making. The roads of Bristol were the first good roads made in this country by Mr. Macadam, who was the surveyor of the Bristol road district, and who worked out the science of roadmaking with the Bristol limestone. There were other things still more important; we could do without limestone for building or road-making, but it was impossible to do without it for cement. It had an extraordinary power, when it had been highly heated, of absorbing water, which made quicklime the basis of all cements. It would be impossible to smelt our iron without lime, and it was used in iron-making, in soda-making, and in a variety of our manufactures. There was, indeed, no one product more important to us than lime as a means of utilising other products. They would see, therefore, if they could trace all these formations to animal life, what an important work those animals had done for us, and for the arts of human life.

THE LATE MR. JAMES BALLANTINE, OF EDINBURGH.

THE name of this gentleman is familiar to our readers as a glass-painter, but it may not be known to many of them that he was also the author of several books, some of which have gone through two or three editions.

Mr. Ballantine died at his residence, Warriston Lodge, Edinburgh, on the 18th inst., at the age of sixty-nine. His death was not unexpected, as he has for upwards of a year past been subject to severe attacks which have latterly increased in violence to such an extent as ultimately to result in paralysis of the brain.

James Ballantine was a self-made man. Born in the West Port of Edinburgh, and bereft of his father when ten years of age, he, with three sisters older than himself, were left to the care of a widowed mother. He was apprenticed to a house-painter in the city, under whom he speedily acquired efficiency as a workman. In these early years he became acquainted with David Roberts, R.A., then scene-painter at the Edinburgh Theatre Royal, and to whom, it is said, he acted as colour-grinder. Having imbibed a feeling for art, Mr. Ballantine entered the School of Design, and attended the anatomy class at the University, with a view to the advancement of his artistic proclivities. Shortly after commencing business as a house-painter, Mr. Ballantine directed his attention to glass-staining, an art then at a very low ebb. At that time the universal practice was that of enamelling the colours on the surface of the glass; but Mr. Ballantine soon discovered the advantages resulting from the introduction of pot-metal, whereby the true sparkle and brilliancy of stained glass are obtained. It is not to be supposed that the true principles of the art dawned upon Mr. Ballantine at once, for at first his practice tended rather in the direction of producing pictures more suited for canvas than the material he had to deal with; but, with the true artistic feeling, he was ever open to new impressions, and ready to adopt whatever tended to advance the line of art he had adopted. He ever expressed a decided repugnance to adopting the style affected by some of his rivals, of imitating the ill-drawn grotesques of an early period, and aimed at giving his work the highest possible artistic value, with which view he occasionally consulted with artists of established position, particularly the late Sir George Harvey, Sir Noel Paton, and Mr. Herdman. Specimens of his work are to be found all over the kingdom, in some parts of the Continent, in the United States, and the colonies.

What first gave Mr. Ballantine an established position as a glass-stainer was the fact of his having been the successful competitor for painting the stained glass for the House of Lords, and from that time onward he has produced many works of great merit. Latterly he has been relieved from the pressure of business by his son, Alexander, who shows an enlightened appreciation of the artistic applicability of coloured glass as a means of high-class decoration.

Mr. Ballantine was the author of a treatise upon stained glass; but this is the least of his literary efforts. As a writer of Scottish songs he attained great celebrity, and in his peregrinations about his native city his ears were frequently greeted by hearing his own songs warbled forth more or less melodiously. Some of these he strung together in a narrative entitled the "Gaberlunzie's Wallet," which attained great popularity; and in another work, "The Miller of Deanhaugh," he also embodied poems and songs. These songs and lyrics are characterised by simple pathos and pawky humour; and in his ballads and descriptive pieces he displays a fine feeling for the pathetic and picturesque.

Mr. Ballantine was an enthusiastic admirer of Burns, and at the annual festival of the bard he was never absent when he could possibly be present, and in 1859 he was one of the most zealous promoters of the Burns Centenary, and acted as secretary for the Edinburgh Committee, and upon that occasion several of his songs were sung.

In the artistic embellishment of the city Mr. Ballantine took a lively interest and often an active part. By his exertions the interior of the Burns Monument was put in a proper state, and he was mainly instrumental in securing to the Scott Monument the statues lately added thereto.

Mr. Ballantine was known to a wide circle of friends, his hospitality was generous, and his company much sought after. He possessed a large stock of anecdote and a fund of humour. His kindly face will be missed by many.

"Ilka blade o' grass bears its ain drap o' dew,"

as he himself sang, but the grass fades and dies and the dew sparkles on it no more.

ENGRAVINGS BY BEHAM.

THE Burlington Club have at present in their gallery an exceedingly interesting collection of old German engravings by the brothers Beham who lived in the earlier half of the sixteenth century. The majority are by Hans Sebald Beham. They combine a good deal of the characteristic German taste for allegory and for quaintly decorative design (a certain degree of German coarseness of conception also), with very fine execution. They include a good many small series of designs of mythological and Christian subjects,—the Labours of Hercules, for instance, and the history of Adam and Eve and the Expulsion, showing a great deal of fine design and very delicate execution on a small scale. Some of the larger and more coarsely-executed works in line, such as the set illustrative of the "Seven Planets," and their effect upon human society as expressed in various groups, are of great interest, and indications of the taste and temper of the period. We understand that these are to be succeeded by a collection of the works of the late Mr. Raven, the landscape-painter, lent by his widow.

WEST CUMBRIAN MINING DISTRICT.

WHILST there has been frequent notice of the growth of the iron mining district of Cleveland, and the coal-mining district of Durham, and whilst the growth of Barrow-in-Furness has not been overlooked, very little attention has been paid to the growth of the mining and iron-making district of West Cumberland. Not only has there been, since the working on a large scale of the ironstone of the district, a growth of some of the many towns which in Lilliputian dimensions studded the district, but there has been a development of the decaying hamlets round about the mines. To learn this it is only needful to trace the condition of that portion of West Cumberland about two score years ago. There was even then a small iron mine at Egremont; but generally the industries were miscellaneous, and of the olden type and proportions. At that date Cockermouth was making linen, cotton, thread, and hats; Maryport was a considerable little shipbuilding town; Whitehaven was, however, a port of considerable dimensions; but Workington preserved only its ancient fame, and the iron works near it, at Seaton, were dwindling slowly down from their previous importance. Carriers and coaches served the conveyance and travelling needs of the district, helped by an occasional "car," and the country "gigs." The trades of the towns were in small dimensions, except that from Whitehaven and Maryport there was a considerable quantity of coal shipped—chiefly to Ireland. The population of the towns and district was, however, almost stationary; and the villages were, to some extent, in a state of decay, so far as their commercial importance was considered. The development in recent times of the iron-mining industry, and the commencement of the steel trade in West Cumberland, has largely changed the state of the whole country, and has built up a series of industries such as have caused a large influx of population. The demand for iron has caused not only the upgrowth of large mining communities in the

centre of the iron-mining district, but it has allowed of the growth of large steel works, of blast furnaces, and of subsidiary industries, at suitable sites along the tract of coast, whilst some of the older industries have been enlarged, and the coal trade has received and is receiving an immense impetus. At Maryport, at Workington, Moss Bay, Whitehaven, and other points on the coast, sets of furnaces have been erected, the small harbours have been utilised, the towns have been increased, and there has been a very great accession to the population alike of the towns and of the country near the great mineral deposits.

Maryport has raised its population from 3,514 in 1821 to 7,443 at the last census; Workington, from 6,415 at the former time, had only risen to about 8,000 at the latter; Whitehaven, from 12,000, has risen to 18,000; but the bulk of the increase in the population has taken place in villages and in a widely-scattered district, and more especially has it manifested itself within the last half-dozen years. The tokens of its increase are seen in the growth of the district, in the building up of institutions, trades, and tokens of the physical, mental, and spiritual life of towns and growing communities, as well as in the uprisal of large industries. At Maryport, co-operation has planted a vigorous shoot, now numbering its members by some 730; and the old town, adding to its ancient shipping, shipbuilding, and general industries the iron manufacture, is extending its boundaries, and planting little hamlets near its pits and works, as well as adding to its clean streets and improving the walks on its "Brow." Workington has felt the depression in what is now its staple trade, but it is recovering therefrom, as the reports of its chief manufacturing company show; whilst the discovery of new seams of coal should give vigour to its trade. Cockermouth, Whitehaven, Cleator, are benefited largely by the up-growth of the iron industry in and around them,—not only directly by the iron works, boiler works, and others of like nature, commenced in the large towns of the district, but also by the fact that they become the market towns of what were the decaying hamlets of a generation ago, which have now been made the populous villages of the iron and iron trades. Something has been done to reduce what were the excessive death-rates,—in one town, there is now a reduction of six per 1,000 in that rate,—and a scheme is now projected in imitation of the larger one of Manchester in regard to Thirlmere, by which water is intended to be brought from one of the smaller lakes for the necessities of some of the towns in that mining district. In meeting the growing educational needs of the district much is now being done, and more is in contemplation, whilst voluntary effort is in some degree meeting the growing religious needs. There yet remains to be provided in some of the towns a fuller development of local government, for Boards of trustees often rule, practically self-elected in great degree, whilst some of the mining villages in the districts are still under the care of olden-style authorities.

Although none of the ports are among the heaviest contributors to the shipbuilding ports of the kingdom, yet Whitehaven has in the last four years raised its contribution from four to ten vessels, of 6,960 tons, and Workington from one to three, of 2,595 tons. Last year there cleared from Workington 663 vessels, of 88,186 tons; from Whitehaven, 1,866 vessels, of 234,560 tons; and from Maryport, 2,002 vessels, of 230,977 tons,—the entrances being much smaller as regards tonnage, because so many of the coastwise vessels were in ballast. There were registered under the Merchant Shipping Act, as belonging to Workington, forty-seven vessels, of 14,363 tons; to Whitehaven, 148 vessels, of 22,139 tons; and to Maryport, ninety-nine vessels, of 24,755 tons. So far as the effect is ascertainable, the development of the iron industry has had the effect of largely adding to the export trade of the ports at which coal and iron are the chief shipments. Last year half a million tons of coal were shipped from Whitehaven, Workington, and Maryport, the bulk being from the latter port. A considerable quantity of iron ore is also shipped at Whitehaven, and from Workington and other ports there is a very large shipment of iron in its crude and manufactured state.

The twin industries of coal and iron have not only revived the trade in these old seaports, but they have built up large industries, and considerable communities have gathered around the mines from which the mineral wealth is drawn. Cumberland, of coal, yields from thirty-seven collieries about 1,400,000 tons, of which it ships one-half to Ireland and to other parts, whilst another large portion is sent by rail out of the district. More valuable is the production of the iron mines, of which in the West Cumberland district there are thirty-one sets, yielding from 29 tons to 271,098 tons yearly; or, in the total, last year, 1,353,910 tons, the value of which is officially stated as 996,046*l*. This value, except that of the adjacent red hematite-yielding district of Furness, is the highest in proportion to yield of our British iron-mining districts. Out of this large quantity of valuable ore nearly a quarter is sent away by sea; another portion, of over 100,000 tons, is sent by rail; and the furnaces in the district use some 900,000 tons—the remainder. In the West Cumberland district there are now forty-nine furnaces built, and, according to the latest "Mineral Statistics," the furnaces in blast were twenty-seven in number, at which some 936,929 tons of coal were used in the manufacture of pig-iron, the quantity of pig-iron made being stated in the same authority as 436,837 tons. As to the finishing iron trade, there are five iron works, including eleven rolling-mills therein, and having attached thereto eighty puddling furnaces. At Workington, the steel manufacture has been planted, and one of the two works has four Bessemer converters, of six tons capacity each, the other has two converters of seven tons each. The growth of these large industries,—that of iron and steel being of recent date,—has caused the development of the district to a very large extent, and there is a tolerable certainty that the maximum growth has not yet been attained. The north-western iron-making district is the repository of the largest deposits of red hematite iron in Britain and the growing demand for steel for railway purposes, and almost absolute certainty that there will be a further growth of the demand for other allied purposes, will give to the west coast a vast advantage, and, to the full that advantage will be felt by the mining district of West Cumberland, from which so large a portion of these valuable ores is drawn. It has in one respect the advantage over its neighbouring district of Furness for it has considerable stores of coal to smelt its iron ores. Under such circumstances, and knowing the vast increase accomplished and expectant, in the demand for steel and for the hematite iron of the north-west, the future of West Cumberland should be secure, and should brighten when the cloud which now obscures the iron industries shall pass away. Of that at the present there is no sign, but even during the dulness there are proposals to extend the facilities for the manufacture of steel, and at Maryport the erection of steelworks near to the busy furnaces has been decided on. With prospects thus brightening, even in the midst of the gloom, the dispersal of that gloom should be the precursor of a greater advance in the mining and iron manufacturing district of Cumberland than it has yet known.

COFFER DAMS.

THE INSTITUTION OF CIVIL ENGINEERS.

At the fifth ordinary meeting, held on the 11th inst., Mr. G. R. Stephenson, president, in the chair, a "Description of Coffer-dams used at Dublin, Birkenhead, and Hull," by Mr. W. J. Doherty, C.E., was read.

The coffer-dam at Dublin, from the design of the author, consisted of two rows of main piles of Memel timber, driven at intervals of 12 ft. from centre to centre, with a space of 4 ft. 6 in. between the rows for the puddle. The main piles in the outer row were 32 ft. in length, and in the inner row from 40 ft. to 42 ft. The spaces between the piles of both the outer and inner rows were filled with sheet-piles 6 in. thick. The sheet-piles of the outer row were driven 12 ft. into the ground, and, reaching up to the level of high water, were 28 ft. long. Those in the inner row were of a similar length, driven to the level of the foundation of the new wall, 24 ft. below low water. On the inner sides of the dam the faces of the sheet piles were in a line with the main piles. The piling, for a length of 150 ft., was driven during the winter, when clay could not be readily procured for puddle. The author, therefore, substituted peat-moss, which fairly answered the purpose. After the exclusion of the tidal water, when the dam had been sufficiently strutted against the old wall, a row of piles 25 ft. long was driven on the land side about 32 ft. from the inner side of the dam, and spaced to correspond with the main piles. Between these inner piles 3-in. sheet-piling was driven from the surface of the roadway to below the foundation of the old wall. In this piling there was a recess 10 ft. deep, and from 15 ft. to 20 ft. in length, in which pumps were erected. As the removal of the old wall was proceeded with, the stone of which it had been built was worked up in the new wall. When this masonry and the struts against it from the dam had been removed, whole-baulk struts, 30 ft. long, were inserted between the land row of piles and the coffer-dam. A row of close sheet-piling, 24 ft. to 26 ft. long and 6 in. thick, was then driven along the land side to support the adjacent roadway; it answered also to receive the strutting of the dam. The strata through which the piles were driven consisted of 2 ft. of soft mud, 4 ft. of fine sand, 3 ft. of vegetable deposit, overlying a bed of alluvial clay of from 4 ft. to 11 ft., and a bed of gravel, interspersed with sand, boulders, and in some cases clay. On taking out the excavations for the first length of the wall, the bed of clay gave sufficient puddle for the next length of coffer-dam, and so on to the end of the work. The use of peat-moss was therefore discontinued. The horizontal struts for supporting the coffer-dam and the roadway were 6 ft. apart, vertically, for the three upper tiers; but, as the pressure increased, the distance was diminished to 5 ft. The pressure appeared to reach its greatest intensity at 16 ft. below low water. As it was found that the whole-timber walings were in many instances broken, the distances between the main piles and struts were reduced from 12 ft. to 10 ft. from centre to centre. To prevent the walings from being crushed at the point of contact with the struts, which were frequently indented to the extent of 1½ in., facing-pieces were spiked against the walings on front and back, and against these facing-pieces the ends of the struts were butted. Even when the distances were reduced to 10 ft., these facing-pieces were splintered with the pressure, yet they preserved the walings from injury

The total length of river wall was 2,310 lineal feet, the contract price for which was 131,728*l*., or 57*l*. 10*s*. per lineal foot, exclusive of the dredging of the foreshore.

THE STATE PATRONAGE OF ART.

At a *conversazione* recently held in the Warrington Art Gallery, Mr. Collinson, formerly head-master of the Warrington School of Art, read a paper, in the course of which he said,—Having had the honour to be officially connected with South Kensington for twenty-three years in carrying out art-teaching, I can testify to the value of State support to the country at large. At the Exhibition of 1851, it was discovered that no part of our national character had been so much neglected as the artistic; hence the establishment of South Kensington, and the schools of art throughout the kingdom; and I hope soon, like Liverpool and Warrington, they will each have their permanent art gallery, for an art school can only be considered half an institution without a gallery at its back. It is needless to say that the influence of these schools is felt far and wide; and the advance that England has made in the arts as applied to her manufactures is acknowledged on all hands, and by every statesman who has ventured to speak publicly on this subject; and even in France (which country has at different times purchased designs by the students of these schools); also other foreign countries, seeing the advances we were making, have sent agents over to investigate and report upon our system. When recently Mr. Poynter succeeded to office at Kensington, on the death of Mr. Burchett, the late head-master, he felt himself bound publicly to acknowledge to Mr. Redgrave that "he had found ready to his hand the most complete and elaborate system of art-education ever propounded, and one which was the admiration of foreign countries," for the construction of which Mr. Burchett received the gold medal at the Paris Exhibition in 1867. Considering the broad and important results wrought by State aid through the medium of these schools, is it wise to leave the rest to private patronage, while we are still mere infants in art, compared with the great schools of the past? Was it not through State patronage of the highest kind, not perhaps such as a modern House of Commons, but by the Popes, then both the temporal and spiritual rulers of almost all of the civilised world, and by Governments formed of men of birth, letters, and high art-culture, who,

during the fourteenth, fifteenth, and sixteenth centuries, courted and encouraged art in the most munificent manner, that the art of the past rose to a state of perfection which we can scarcely hope to attain? Artists of the highest rank were employed to decorate their churches and palaces with a splendour never since equalled. They were treated with the greatest respect and consideration,—such as is quite unknown in modern times. In conclusion, let us glance for a moment at one or two instances. Only in 1454, two years after the taking of Constantinople by the Turks, and when peace was established, the Sultan, being a great admirer of Venetian art, begged the Venetian Government to send him one of their artists; and the famous Council of Ten, after much deliberation, selected Gentile Bellini and sent him in one of the State galleys to Constantinople, where he was received with much honour. As an example of the Turkish humanity of those days, there is an interesting little anecdote on record. Bellini, in token of his homage to the Sultan, presented him with a picture of the head of John the Baptist after the decapitation. Although admiring it greatly, the Sultan began to criticise the appearance of the neck, observing that the shrinking of the severed nerves was not properly expressed. Bellini, not seeming to understand his meaning, Mohammed called in one of his slaves, and, commanding him to kneel down, with one stroke of his sabre cut off his head, thus giving the horrified painter a practical lesson in anatomy. After this Bellini returned as quickly as possible to Venice, bearing with him many rich gifts and a letter of strong recommendation to his own Government. In Florence we find a good example of Government patronage. In 1401 the members of the chief government acting with the Consoli resolved to erect a second gate in bronze to the Baptistery of St. John, which was to excel if possible all other such works: and no expense was to be spared in the production. Their resolve was published throughout Italy, and many artists assembled in Florence to offer themselves in competition; but of these seven only were chosen as worthy to compete. The expenses of each were paid for one year, and studios with all the necessaries were provided. Out of these Lorenzo Ghiberti was selected for this great work, amidst the acclamations of the assembly composed of the artists and the chief government. The result was the production of those splendid gates of San Giovanni, which about a century afterwards Michelangelo pronounced worthy to be the Gates of Paradise; and they are still the admiration of the world. These are only single examples of what went on in Italy during the fourteenth and fifteenth centuries, and in the sixteenth, when we find art brought to its culminating point in Rome under Pope Julius II., by Michelangelo and Raffaelle, and in Venice by Titian and the whole Venetian school. After these masters, the art of Italy began to decline, and with that Italy itself. If therefore this country is ever to arrive to a like perfection, the patronage of art must not be left to a few private individuals. Corporations may do much, but the State must lead the way.

THE NEW IMPERIAL BUILDINGS AND HOTEL.

The new Imperial Buildings and Hotel, on the Holborn Viaduct, which have only recently been erected from the designs of Mr. Cronk, architect, were last week offered for sale at the Mart, Tokenhouse-yard, by direction of the Association of Land Financiers, who are the owners. There was a large attendance of capitalists and others. The particulars described the buildings as consisting of the hotel and ten shops, with lofty and well-lighted basements, and seven upper floors, covering a ground area of 5,800 ft. The property was said to be held under a Crown lease for eighty years, at a ground-rent of 2,500*l.* a year, and producing a gross rental of 7,500*l.* per annum. Adverting to the property as an investment the auctioneer (Mr. Milner) stated that the tenants of the hotel (the rent of which alone is 3,500*l.* per annum) had expended upwards of 22,000*l.* in furniture and fittings, which in itself was an ample guarantee for the rental, but he added that the Association of Land Financiers, who were the vendors, were ready to enter into an arrangement with the purchaser guaranteeing the rent. When the bidding reached 75,000*l.*, the auctioneer remarked that 81,000*l.* was the very least sum at which the property could be valued, and that at that price it would pay the purchaser six per cent. There being no further offers beyond 75,000*l.*, the property was withdrawn.

PURIFYING AND SOFTENING WATER.

Sir,—I am much interested by the article in the *Builder* relative to the above. As far as I can gather, in lieu of settling-tanks for clearing the water after softening by the addition of lime-water, Mr. Porter passes the water through a sort of filter-press (except that very little pressure is used), thereby removing the carbonate of lime from the water.

When the cloths are choked it is necessary to remove them from the machine and wash them; and this is the part I do not quite understand. If the cloths are to be hand-washed, why place them in a Porter machine?

Why would not cloths in the shape of ordinary filter-bags, such as are used by sugar-refiners, do equally well, 70 ft. of which, with the attendants, would not cost as many shillings as Mr. Porter's machine does pounds, besides being infinitely less trouble to wash?

It is stated in the article that this hand-washing is an "essentially important and interesting feature in the process." Perhaps so; but I rather fancy Mr. Porter is here making a virtue of necessity, as, without hand-washing, his machine, I gather, would not work for more than ten hours; and, if so, why use a machine at all?

S. W.

LIGHT AND AIR CASE.

CHADWICK *v.* CORBETT AND ANOTHER.

This was an action (Exchequer Division) brought to recover compensation or prevention in respect to the wrongful obstruction of light and air. The defendants pleaded, among other things, that the plaintiff had acquiesced in their actions.

The plaintiff held a lease of 15, Coleman-street, in the City of London, dated 24th of June, 1873, for seven years. She took the premises as a coal and coke merchant, and supplied her goods to occupiers of offices in the City. At the time she obtained the lease there was only a wall about 12 ft. high and then an open space of 23 ft. in front of the building. Before the action was brought, however, the defendants had erected a building 48 ft. high close to her premises, and had by so doing obstructed light and air. The defendants pleaded acquiescence on the part of the plaintiff, and that the damages, if any, were only nominal.

Mr. Waddy, after the plaintiff's case had been concluded, submitted there was no case to go to the jury, upon the ground that the plaintiff had failed to establish her enjoyment of the light and air in the manner alleged for a period of twenty years, and also that the action had not been brought until sixteen months had elapsed after the completion of the building by the defendants.

Mr. Justice Lush decided against the learned counsel.

Mr. Waddy then commenced to open the case on behalf of the defendants.

Mr. Justice Lush remarked that unless the defendants were able to establish more than the acquiescence alleged in the statement of defence their case upon that point would fail.

Mr. Waddy submitted that the fact that the buildings complained of were known to be in course of erection by the plaintiff for a period of five months proved acquiescence.

Mr. Justice Lush said he would hold that an actual agreement was necessary.

Mr. Waddy then proceeded to bring the attention of the jury to the question of damages alleged by the plaintiff, which he urged at the most were only nominal.

The Jury ultimately returned a verdict for the defendants.

PORTLAND CEMENT CONCRETE.

Sir,—Will any of your readers kindly inform me where any channelling and curbing is in use made with the above material and cast in *one section*? Any particulars, such as length of time in use, and results, &c., would be acceptable.

Surveyor.

VARIORUM.

"Field Paths and Green Lands" is the title of a very pleasant little book by Louis J. Jennings (John Murray), which describes a number of country walks, mostly in Surrey and Sussex. Thus we get for headings "Winchelsea and Rye," "Round about Hastings," "Mayfield," "Hayward's Heath to East Grinstead," and so on. Mr. Jennings is not an archæologist, and his talk is therefore more about the country and the people than of buildings and antiquities, and everything is on the surface. A few trifling views illustrate his gossip.——"The Municipal Corporation's Companion, Diary, Directory, and Year Book of Statistics for 1878" (Waterlow & Sons, and Vickers), contains an immense amount of useful information concerning London, and the various cities and boroughs of the United Kingdom. We cannot too highly praise it.——"Whitaker's Almanac" (1878) is another admirable book of its kind. Amongst the valuable additions to the present edition are a concise Summary of English Constitutional Law, and a Key to the Calendar.

The Chancel of St. Stephen's Church, Avenue-road, Regent's Park, has been decorated by Mr. Rubardt, from designs supplied by Mr. A. P. Goodman.

Miscellanea.

Irrigation *v.* Famine in India.—On the 13th inst. General Sir Arthur Cotton read a paper before the Indian Association at their rooms, Great George-street, Westminster, entitled "The Prevention and Counteraction of Indian Famines." Sir Arthur Cotton's preventive for famines is canal irrigation, and in the course of his paper he dealt with the cost and the results of his scheme. He claimed that India needed above all things, not speedy carriage, but cheap carriage, and that canals were eminently calculated to afford this. Wherever irrigation had been tried it had been most effective in keeping off the famine, while according to Mr. Thornton, the head of the Public Works Department of the India Office, the average return on the whole expense was 7½ per cent. Sir A. Cotton pointed to the great tanks built by the native princes, and still remaining almost intact, as one direction in which the Government might usefully expend capital. He disagreed with those who complained of the hopeless state of India. In spite of our terrible mistakes, that she was rapidly advancing was proved by the increasing railway traffic and the increased consumption of salt. The finances, too, were in a sound state, although no words could express the wickedness of the opium traffic. He maintained that the experience of Godavery, where the revenue had been raised 350,000*l.* a year, showed that the revenue of India could easily be raised by honest and honourable means.

The Ground around St. Paul's Cathedral.—According to the arrangement made between the Common Council and the Dean and Chapter the railings around the inclosure at the east end are to be lowered, and the inclosure laid out and planted as an ornamental garden; the fence of the north-east churchyard (St. Faith's) is to be thrown back at the north-east corner, but the space so given up is not to be thrown into the roadway, but form a paved area in front of the gateway, and the boundary of such area is to be marked by granite posts similar to those around the west area. A portion of the south-eastern churchyard is to be cut off for the widening of the roadway, the gate to be placed further back, and a paved area formed and treated similarly to that of the north-east angle. Many years have passed since we commenced the movement for bringing about some improvement here. We well remember the late Dean Milman saying to us, not very long before his lamented death, "I like everything in the *Builder* but its persistent urging that we should give up or open the enclosed area around the Cathedral. We shall never do so, depend upon it." It will be done, nevertheless.

The St. Pancras Gardens.—The special committee for the laying-out of old St. Pancras and St. Giles-in-the-Fields burying-grounds as gardens have reported to the vestry that the Baroness Burdett-Coutts had evinced her great interest by erecting a marble monument to preserve the head-stone originally standing over the grave of John Walker, author of "Walker's Pronouncing Dictionary"; also, that they had approved of a handsome design for a memorial sun-dial to be erected by her ladyship to the memory of the illustrious dead lying in the grounds, at a cost probably exceeding 5,000*l.*, of a unique character, and of lasting usefulness in recording the names of many distinguished persons buried there. The committee reported further that the sum of 1,000*l.* presented by the Baroness had been expended in the erection of a greenhouse, in accordance with the suggestion of her ladyship.

Roman London.—Some discoveries have recently been made while excavating within the precincts of St. Bartholomew's Hospital. In clearing what was once the site of Pye-corner for the erection of a new library and museum, two stone sarcophagi were exhumed. They were 11 ft. from the surface, situated some 50 ft. from the new buildings in Windmill-court, and at no great distance from the line of the City wall. They lay east and west, are about 7 ft. long, of coarse colitic stone, have massive lids or covers, and have been identified as Roman. In one two skeletons were found: one of a man with his head to the west, the other of a woman with hers lying towards the east.

The Dragon of Bow Church, after being re-gilt, was safely restored to its lofty place on Saturday last, the 22nd inst.

The Fire Brigades Association. — The winter general meeting of the council of this Association was held on the 17th inst., at the Midland Grand Hotel, Col. Sir Chas. H. Firth, president, in the chair. The primary object of this Association is the preservation of life and property from fire, and this great object the Association proposes to attain by organising the numerous fire-brigades already existing in the United Kingdom under one council, by educating, training, and rewarding firemen in their brave efforts to carry out the purposes of the Association; and, further, by providing a fund in aid of the widows and orphans of those who too often sacrifice their lives in the discharge of their noble duty. There is another object proposed by this Association in its desire to disseminate the fullest possible information on the subjugation of fires, and to encourage all inventions and appliances which can in any way tend to subdue or alleviate the effects of that devouring element which has wrought so much destruction on the grandest works of man.

Fall of a Building, Edinburgh.—Last week the gable of Milne's Hotel, Edinburgh (in which there had been a fire a few hours previously), suddenly gave way, and crashed through several stories. A number of persons were buried in the ruins. At two o'clock ten persons were missing. A rescuing party was formed, and worked energetically to recover those underneath the *débris*. At five the bodies of two women and a child were extricated, and the exertions of the rescuers were stimulated by hearing distinctly the voice either of a man or a woman some distance within the ruins. At eleven o'clock the workman had not recovered any more bodies. Purvis, a cabdriver, was afterwards got out in a very exhausted state, and taken to the Royal Infirmary, where he died.

Fatal Accident to an Architect.—On the 22nd inst. a melancholy accident happened at the St. David's Station of the Great Western Railway to a professional gentleman well known in Exeter, and has, unhappily, resulted in his death. The deceased was Mr. Joseph Neale, aged 42, an architect, residing at Weston-super-Mare. It appears that Mr. Neale had taken a ticket with the intention of going home to spend Christmas, and intended travelling by the 3·5 train from St. David's. Endeavouring to enter the train when in motion he was knocked down, fell on the rail, and was killed. The deceased was architect for the new chapels at the Wonford House Hospital for the Insane, and the Exminster Asylum. His design for the restoration of Heavitree Church tower recently obtained the first premium.

Baths for Lochee.—At a meeting of the Baths Committee of the Lochee Police Commission, on the 10th inst., two plans of a proposed swimming-bath at Lochee were submitted, the estimated cost being 3,000*l.* and 3,600*l.* respectively. The size of the bath is 60 ft. by 25 ft., and in construction is similar to the second and third class swimming-baths at Dundee. The meeting generally approved of the plan, whose cost is estimated at 3,000*l.*, but it was remitted to the treasurer to bring up a report of the probable revenue.

The Liquefaction of Oxygen has been effected. Most important practical results seem bound to follow.

Dorchester School of Art.—The annual meeting of this school was held on the 19th inst. The president (Mr. John Floyer, M.P.) presided. As stated in the report for the past year fifty-five students sent 625 works to South Kensington. Miss Florence Gundry was adjudicated a third-grade prize, her work being selected for national competition. Mr. Leonard Last had the prize for the best "study from the antique." Mrs. Groves was awarded the prize for advanced water-colour blossoms. Emma Lock was highly commended.

TENDERS.

For putting in foundations, &c. for Salisbury Congregational Church. Messrs. Tarring & Wilkinson, architects:—

		Allow for Old Materials.
Dolman & Harris	£800 0 0	£20 0 0
Hale & Sons	707 0 0	30 0 0
Sawkins	591 0 0	30 0 0
Tryhorn (accepted)	567 0 0	20 0 0

For the erection of two villa residences on the Skirbeck Estate, Boston, Lincolnshire, for Mr. J. Storr. Mr. Henry H. Leonard, architect:—

Coney (accepted)	£1,750 0 0

For county lunatic asylum, Devizes, Wilts. Mr. H. Weaver, architect. Quantities supplied:—

Crook	£4,979 10 0
Calder	4,221 7 0
Denner	4,000 0 0
Jones & Co.	3,870 0 0
Stephens & Bastow	3,829 0 0
Sawkins	3,716 0 0
Long	3,686 0 0
Burgess	3,463 0 0
Mallings (accepted)	3,385 0 0

For constructing about seven miles of stoneware pipe sewers, manholes, lampholes, &c., erecting pumping station, chimney-shaft, three cottages, and other buildings, for Basingstoke sewerage. Mr. W. F. Rowell, engineer:—

Contract No. 1.

Bagbird	£21,520 0 0
Nowell & Robson	19,395 0 0
Crockett	19,000 0 0
Wood	18,925 0 0
Young	18,850 0 0
Pellett & Bentley	18,029 0 0
Rendall	17,999 0 0
Dover	17,952 0 0
Young & Co.	16,977 0 0
Ritson	16,461 0 0
Cook & Co.	16,088 0 0
Potter	15,639 0 0
Patterson	15,470 0 0
Batten	14,637 0 0
Morrow & Eckett	14,411 0 0
Mackey	14,290 0 0
Hookway	13,298 0 0
Small & Son	12,431 0 0

For manufacturing and erecting two 15-h.p. horizontal condensing steam-engines, two boilers, and fittings; also providing and laying about 2,200 lineal yards of 12-in. cast-iron pipes, valves, and other works, for Basingstoke sewerage:—

Contract No. 2.

Savill-street Iron Co., Sheffield	£5,921 0 0
Bland & Sons	5,500 0 0
Young & Co.	4,941 0 0
Mason	4,798 0 0
Derham	4,781 0 0
Thornwell & Warham	4,574 0 0
Powis	4,601 0 0
Wood	4,450 0 0
Hookway	4,450 0 0
Dale	4,400 0 0
Oliver & Co.	4,320 0 0
Pontifex & Wood	4,133 0 0
Kellett & Bentley	3,979 0 0
Laidlaw & Sons	3,972 0 0

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